



# **THE IMPACT OF THE CHANGE FROM BASEL II TO BASEL III ON THE PROFITABILITY OF THE SOUTH AFRICAN BANKING SECTOR**

By

**Ebrahim Sadien**

Supervisor: **Professor Phillip de Jager**

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## **ABSTRACT**

The objective of this study is to analyse the impact of the change from Basel II to Basel III on the profitability of the South African banking sector. South African banks are regulated in accordance with the Basel Accords and, as such, this study reviews the literature on bank regulation and specifically the evolution of the Basel Accords. The 2008 global financial crisis exposed certain flaws in the global regulatory framework and paved the way for the introduction of Basel III, of which South Africa commenced implementation on 1 January 2013. As mentioned, the review of banking regulation literature will specifically focus on the changes from Basel II to Basel III, with a further focus on two of the key changes introduced by Basel III: the capital requirement amendments and the new liquidity ratios. The study examines the top five banks in South Africa, as these make up 91.1% of the industry's banking assets (as of December 2012). The top five banks are used to create a representative bank of the South African banking sector and an accounting model is performed using a DuPont analysis in order to measure profitability. With respect to the Basel III capital changes, the results show that a 2% increase in capital by increasing the equity-to-asset ratio and all else held equal will result in a decrease of 0.29% in return on equity (ROE) for the South African banking sector. With respect to the Basel III liquidity measures, a 25 basis decrease in maturity transformation, all else held equal, will translate into a 3.38% decrease in ROE. The study contributes to the recent literature on Basel III and profitability. The results will also benefit the South African banking industry and regulators when assessing the profitability impact of the new Basel regulations.

# TABLE OF CONTENTS

PLAGIARISM DECLARATION .....	ii
ACKNOWLEDGEMENTS .....	iii
ABSTRACT .....	iv
TABLE OF CONTENTS .....	v
LIST OF TABLES .....	vii
LIST OF FIGURES .....	vii
1 INTRODUCTION .....	1
2 LITERATURE REVIEW .....	6
2.1 Bank Regulation .....	6
2.2 Basel Accords .....	7
2.2.1 Basel I .....	8
2.2.2 Basel II .....	9
2.2.3 Global Financial Crisis.....	13
2.2.4 Basel III .....	15
2.3 South Africa Banking Regulation .....	24
2.3.1 Risk reports of the big five South African banks .....	27
2.4 Regulation and Bank Profitability.....	31
2.5 Problem Statement.....	33
2.6 Research Question.....	35
3 RESEARCH APPROACH.....	36
3.1 Introduction.....	36
3.2 Research Design .....	36
3.3 Data Description .....	38
3.4 Data Analysis .....	39
4 RESULTS .....	44
4.1 Introduction.....	44

4.2 South African Banks' Expectation of the Basel III Effect.....	44
4.3 Results of Basel III Capital Change.....	48
4.4 Results of Basel III New Liquidity Ratios .....	49
4.5 Actual Profitability of the South African Banking Sector .....	51
4.6 Market Performance of the South African Banking Sector .....	54
4.6 Discussion of Results .....	55
4.6.1 Capital changes under Basel III .....	55
4.6.2 Liquidity changes under Basel III .....	57
4.6.3 Market performance data .....	60
4.6.4 Summary and implications .....	61
5 CONCLUSION, LIMITATIONS OF THE STUDY AND OPPORTUNITIES FOR FURTHER STUDIES.....	64
5.1 Conclusion.....	64
5.2 Limitations of the Study .....	66
5.3 Opportunities for Further Studies .....	66
6 APPENDIX .....	68
7 REFERENCES .....	73

## LIST OF TABLES

Table 2.1: Basel II, Pillar 1 evaluation methods .....	10
Table 2.2: Basel III liquidity ratios implementation timeline.....	21
Table 2.3: South African banks capital ratios 2012 (Basel II) .....	29
Table 2.4: South African banks capital ratios 2013 (Basel III) .....	29
Table 4.1: Increased capital change results .....	48
Table 4.2: NIM on interest earning assets .....	49
Table 4.3: NIM effect due to a decrease in maturity transformation .....	50
Table 4.4: ROA and ROE effect due to a decrease in maturity transformation.....	50
Table 4.5: Basel capital ratios 2012-2014.....	51
Table 4.6: South African banking sector profitability 2012-2014.....	52
Table 4.7: South African banking sectors exposure to short-term assets .....	53
Table 4.8: South African banking sector's exposure to short-term funding.....	53
Table 4.9: Assets maturity analysis .....	54
Table 4.10: Liabilities maturity analysis .....	54
Table 6.1: South African banking sector RWA 2012-2014.....	68
Table 6.2: South African representative bank profit and loss 2012-2014.....	69
Table 6.3: South African representative bank balance sheet 2012-2014.....	72

## LIST OF FIGURES

Figure 2.1: Minimum capital requirements comparison between Basel II and Basel III .....	18
Figure 2.2: Relationship between the minimum CET1 requirement and buffers.....	23
Figure 2.3: South African Basel minimum requirements.....	26
Figure 2.4: Major South African banks' capital ratios.....	30
Figure 3.1: Overall research design.....	36
Figure 3.2: Composition of total banking-sector assets .....	38
Figure 4.1: Gross Savings as percentage of GDP .....	46
Figure 4.2: PE ratio of the South African banking industry (2012-2014) .....	55



# 1 INTRODUCTION

In the last few decades, financial markets have rapidly changed and developed, driving evolution in the banking industry and bank regulation. There has been a move from periods of regulation to deregulation in the 1980s, to current attempts at a system wide macroprudential regulatory policy. One of the most important rationale for bank regulation is to provide a stable banking and financial sector (Barth, Caprino & Levine, 2006:8). Bank failure or a bank crisis can have severe systematic consequences, with bank failure or a banking crisis leading to severe systematic consequences, hence making bank regulation fundamental.

Specifically capital adequacy regulation has received notable attention in recent decades. Optimal regulation and many positive features can be achieved through capital adequacy standards (Dewatripont & Tirole, 1994). A bank's capital serves as a buffer against losses. Lind (2005:26) explains that capital is needed to reduce volatility in banks' earnings and to encourage prudence amongst bank owners as their own capital is at stake. Banks with sufficient capital are better able to manage their risks and reduce their chances of bank runs and failures (Dupuis, 2006:1). Capital ratios were introduced as a method to establish minimum regulatory requirements within the banking sector, but were only imposed as an international benchmark after the numerous banking crises of the 1980s (Balthazar, 2006:15).

The Basel Committee on Banking Supervision (BCBS) develops guidelines for bank regulations and recommends best practices that banks should follow (Casu, Girardone & Molyneux, 2006). The BCBS – headquartered at the Bank for International Settlements (BIS) – was formed following the failure of the Bretton Woods system of managed exchange rates in 1973 that resulted in financial market turmoil. The aim of the committee is to bring stability to the financial sector by improving global banking regulation and supervision (Bank for International Settlements, 2014:1). The BCBS was initiated by the central bank governors of the G10 countries and officially sets international guidelines for banking regulation. Professor Goodhart (2011) mentions that the “BCBS has become a de facto international regulatory body”, although their publications do not have any legal standing. Instead, the BCBS draw up broad supervisory standards and guidelines with the expectation that authorities worldwide will implement them in a manner that best suits their own national systems. In this way, the

BCBS encourages convergence towards common practices and standards (Bank for International Settlements, 2001:2). Ultimately, the decision to implement any of the BCBS standards rests with the central banks of individual countries.

The Basel Committee enhanced their inclusiveness and acceptability by expanding membership in both 2009 and 2014. Originating from the G10 countries, it now includes 28 jurisdictions (Bank for International Settlements, 2014). The main Basel Committee achieves its responsibilities through several subcommittees, which have been set up to produce new regulatory standards, as well as to review the impact of changing regulations, the effectiveness and consistency of implementation and the convergence between banking and other standard-setting regimes (SARB, 2014:11).

Due to several crises in the 1980s and the increasingly interconnected nature of the global financial system, a strong need for coherent, global banking regulation emerged. As a result, and in an effort to bring stability to the banking and financial sectors, the BCBS released the 1988 International Convergence of Capital Measurement and Capital Standards (known as Basel I). Basel I introduced a basic risk weighted capital adequacy ratio that has become the foundation of banking regulation. The ratio, which only considered credit risk, was set at 8%. The omission of other important risks were criticised and due to this, together with many other weaknesses of Basel I, the BCBS eventually released their second Accord, Basel II, in 1999. There were several shortcomings to Basel I but, according to Lind (2005:24), the overarching reason for the adoption of Basel II was due to the significant change in banking instruments and operations since the inception of the first Accord.

Basel II was approved by the BCBS in 2004 and maintained the capital adequacy ratio from Basel I. The new Accord also addressed market and operational risk in conjunction with credit risk. The aim of Basel II was to improve capital regulation and further strengthen the soundness and stability of the international banking system by encouraging banks to improve their risk management policies (Bank for International Settlements, 1996:1). In contrast with the first Accord, Basel II was based on three pillars: (1) the minimum capital requirement; (2) the supervisory review; and (3) market discipline. However, like its predecessor Basel II had shortcomings and the 2007 financial crisis raised serious questions around global regulatory and supervisory frameworks. The global financial crisis exacerbated these shortcomings and called for

weaknesses in global banking regulation to be addressed. Basel II was shown incapable of protecting banks against failures, which is an important rationale for bank regulation.

Further modification to the Accords was required, and in 2010 the BCBS published Basel III with an effective date of implementation from 2013. The 2007 crisis brought issues such as leverage and poor liquidity to the attention of regulators, which the new Accord attempts to address. Basel III not only enhances the current capital regulation built under the previous Accords but also incorporates a system-wide macroprudential approach. The major changes from Basel II to Basel III will be addressed in Section 2.

Although emerging market economies were not intended to be included in the Basel I framework, many adopted its recommendations (Balin, 2008). Similarly, despite Basel II being designed for the G10 countries, many nations outside the G10 adopted the framework as it was structured in a manner that both developed and developing countries could adopt (Mboweni, 2004:5).

The South African Reserve Bank (SARB) is the central bank of South Africa and is responsible for bank regulation in South Africa. Specifically, the Bank Supervision Department (BSD) of the SARB is responsible for prudential supervision of banks. South African banks are regulated in accordance with the Basel Committee's recommendations on banking supervision (Mboweni, 2004:1). Furthermore, South Africa is a member of the Basel Committee, having joined in 2009. South African banks are public companies registered under the Banks Act, 1990. South Africa commenced implementation of Basel III on 1 January 2013 and will follow the official phase in period until 1 January 2019. As part of the Basel III monitoring, South Africa has to submit data to the Bank of International Settlements.

The regulatory reform introduced by the Basel Accords has raised questions around the impact on profitability for the banking sector. The global financial crisis serves as a reminder of what the potential impact on overall economic activity should banks' profitability levels be severely impacted. Despite the recent increase in studies on Basel III, the impact on profitability remains unclear. Now that the 1 January 2013 Basel III commencement date has passed and South Africa is within the phase in period, focus has shifted to implementation and the impact of the new measures. From a basic accounting perspective, an increase in capital requirements under Basel III should reduce return on equity (ROE). Also holding shorter term, lower yielding assets in order

to meet the Basel III liquidity ratios should reduce return on assets (ROA). Banks are able to pass on these increased costs to borrowers by, as an example, increasing lending rates, which can offset the fall in ROE (King, 2010).

The regulatory changes under Basel III may therefore encourage South African banks to increase lending rates in order to counter the lower profitability effect. A higher charge on loans can have further macroeconomic knock-on effects and studies like Slovik and Cournède (2011) evaluate the Basel III impact on lending spreads and GDP growth. Increased lending rates are likely to affect credit growth for South African banks and also depress economic activity. A measure of the direct impact of Basel III on South African banking profitability is therefore important and has been discussed and modelled in this study. The study focuses on the tighter capital and new liquidity requirements proposed by the Basel Committee. The five major South African banks are used to create a representative bank of the South African banking sector and an accounting approach is adopted to measure profitability. The representative bank and accounting model is similar to the approach utilised by the BIS themselves in a study (King, 2010) conducted on Basel III and banks' lending spreads in 2010.

Creating a representative bank within the South African context is feasible due to the high level of concentration in the banking industry. A few major banks dominate the sector and the largest five accounts for 91% of the total banking assets in South Africa (Bank for International Settlements, 2015:7). The representative bank approach allows for sensitivity analysis and an advantage of the approach is the ability to measure the effect of different responses to regulation on profitability.

This study analyses a comprehensive view of the capital and liquidity changes under Basel III, and contributes to recent literature on the impact of the Basel III regulations, most of which has been performed by the BIS. It is for this reason that most of the cited documents in this study are BIS documents and only a few journal articles are used. The purpose of the results of this study is to establish the extent to which the South African banking sector should be concerned about the profitability impact of Basel III. It is important to note though, that the liquidity regulation under Basel III is not yet fully in place and therefore it is difficult to draw conclusions without assumptions and estimates. A comprehensive view of the capital and liquidity changes under Basel III is analysed within the context of South Africa. The study also uses triangulation in order to

strengthen the validity of the findings and create a deeper and wider understanding of the topic, ultimately providing a useful tool with which to measure regulatory impacts on the South African banking sector.

## **2 LITERATURE REVIEW**

### **2.1 Bank Regulation**

The banking system is inherently unstable. According to a World Bank study there were 112 systemic banking crises, in 93 countries between the late 1970s and the end of the twentieth century (Caprio & Klingebiel, 1997). Banks are vulnerable as their liabilities (such as demand deposits) are typically short term and can be withdrawn at any time, while their assets (such as mortgages and business loans) are long term and normally illiquid in nature. The mere prospect of insolvency and the susceptibility to market rumours also leaves banks vulnerable to contagion effects.

Banks play a pivotal function in the economy. Problems within the banking sector affect the financial system and the economy more severely than problems in most other sectors. The high degree of interconnectedness among financial institutions and the system-wide consequences that result from a failure of a bank is what distinguishes it from the failure of a non-financial firm (Crockett, 1996). A fitting example of this is the Global Financial Crisis discussed later in this section.

The final report of the National Commission on the causes of the financial and economic crisis in the United States published in 2011, states that the financial crisis “was not a single event but a series of crises that rippled through the financial system.” An ever-present debate surrounds the fact that a regulated industry (as opposed to a non-regulated or less regulated industry) has in the recent past experienced collapses. To reduce the likelihood or even avoid a banking crisis, bank regulation is fundamental. Crisis prevention however, is not the sole factor for bank regulation, as a number of further reasons exist. Firstly bank regulation is integral in terms of customer protection; secondly to protect the public against criminal activity (fraud, money laundering and tax evasion); and thirdly for the safe provision of goods and services that are important for a society or economy.

As economic externalities can render the banking system vulnerable, bank regulators must monitor risks at the macro level as well. Examples of such macro prudential regulation pertain to capital requirements and liquidity requirements.

Lind (2005:25) emphasises three factors that form the rationale for regulating banks; (1) certain banking activities are intrinsically vulnerable, (2) due to contagion, even minor disturbances can threaten overall financial stability and (3) with respect to key services, banks are the dominant providers. According to Schooner and Taylor (2010), the existence of information asymmetries provides further rationale for bank regulation. In this case, regulation is justified due to failure in the market for consistent and timely information.

Adequate regulation of banks is critical to the economic health of countries and international markets. Banking regulation should not be complex and regulatory capital should be appropriately aligned to the risks banks face (Griffith-Jones and Persaud, 2008:1).

Banking regulation historically has experienced both waves of deregulation and regulation with tighter policies following periods of crises (Balthazar, 2006:5). In recent decades a notable trend has been the growing importance of capital adequacy standards as a measure of banks' soundness. According to Dupuis (2006:1), adequate capital reserves serve an important function in protecting banks against losses. These capital reserves can absorb temporary losses allowing a bank to remain solvent until profitability is restored. Schooner and Taylor (2010) argue that capital regulation attempts to "correct the market failure resulting from banks" preference for a higher debt/equity ratio than is socially optimal." Each jurisdiction however had different rules in relation to capital requirements. In an effort to create a common regulatory standard as well as a response to the growing instability within the banking industry during the 1980's, the Bank for International Settlements (BIS) developed a framework known as the Basel Accords.

## **2.2 Basel Accords**

The Basel Accords have been both influential and instrumental in centralising banking regulation, supervision and capital adequacy standards. The BIS Committee on Banking Supervision administers the current framework of minimum bank capital regulation.

### **2.2.1 Basel I**

The 1988 Basel Accord brought about a convergence in international bank capital regulation. According to Jackson (1999:1), the adoption of a standard framework in 1988 by the Basel Committee intended to improve the soundness of the international banking system by increasing capital holdings, and to reduce competitive inequalities between internationally active banks in different countries.

The 1988 Accord (Basel I) explicitly considered only credit risk. It required banks to hold a minimum total capital equal to risk-adjusted assets of 8% and at least 4% of Tier 1 (core) capital. The Accord split capital into two classes based on its quality: Tier 1 and Tier 2. Tier 1 consists mainly of equity and Tier 2 consists mainly of debt instruments and the Accord specified that Tier 2 capital could not exceed Tier 1 capital. To determine risk-weighted assets for credit risk, exposure on a bank's balance sheet is assigned a given risk weight ranging from 0 to 100 percent.

$$\text{Basel 1 Capital Ratio} = \frac{\text{Tier 1 capital} + \text{Tier 2 capital}}{\text{Risk weighted assets}} \geq 8\%$$

It is important to note that Basel I was created to enhance regulation only within the member states of the Basel Committee (a group of 11 nations). The agreement states that it is not intended for emerging market economies due to the unique risks in these economies. The fact that it was not intended for emerging markets created a number of known and unforeseen drawbacks. Balin (2008:6) discussed a few consequences of Basel I. "Short-run non-OECD bank debt is risk-weighted at a lower relative riskiness than long-term debt and therefore Basel I has encouraged international investors to move from holding long-run emerging market bank debt to holding short-run developing market instruments. This has amplified the risk of "hot money" in emerging markets and has created more volatile emerging market currency fluctuations." Balin also cautioned that the lack of deep and liquid capital markets in emerging market economies make capital adequacy ratios less reliable. The absent effects on emerging markets together with the limited scope of the Accord to ensure international financial stability were significant criticisms of Basel I. Many agreed that the "one-size-fits-all" Basel I system



was too simple and led to inefficient uses of capital. Furthermore, Basel I did not consider the large array of risks present in the banking industry. A major shortcoming was the small selection of risk weights and its inability to differentiate levels of credit risk within the same asset class. An example of this was the creditworthiness of well-established, profitable, listed companies as opposed to small start-ups.

Basel I did not consider operational risk; defined later in the Basel II Accord as the “risk of loss resulting from inadequate or failed internal processes, people, and systems or from external events.” Operational risks have been ever-present in banking but only received suitable recognition under Basel II. As banking progressed, became more complex and banks began moving into non-traditional products, operational risk increased albeit not dealt with under Basel I. Eubanks (2006:9) discusses how operational risk was a major cause of bank failures but not taken into account in Basel I. He reiterates this by highlighting that fraud contributed to eight of the 11 U.S. bank failures in 2002 and was also the direct cause of failure in several other cases.

Another argument against Basel I was that it permitted regulatory arbitrage. Jones (2000:36) points out how banks attempted to deal with regulatory capital restrictions such as those imposed by Basel I. “Cosmetic adjustment exploits shortcomings in the measures of total risk appearing in the denominators of Basel 1 regulatory capital ratios.” For example, securitization provided opportunities for banks to reduce their regulatory measures of risk, with little or no corresponding reduction in their overall economic risks - a process termed ‘regulatory capital arbitrage’ (RCA). Jones (2000:51) stressed the importance of seeking ways to more closely align regulatory measures of risk with banks’ true economic risks.

### **2.2.2 Basel II**

A full version of Basel II was published in 2006 primarily as a response to criticisms of Basel I and the evolution of banking worldwide. In contrast to Basel I, Basel II was founded on three pillars with each pillar focusing on a particular segment of the banking system. Pillar one deals with minimum capital requirements associated with credit risk, market risk, and operational risk. This aligned the minimum capital requirements more closely to banks’ actual underlying risks. Pillar two deals with supervisory review and

ensures that banks develop sound risk management practices. This allowed supervisors to assess the reasonableness of banks' assessments of their own risks. Pillar three establishes core disclosure by banks in order to improve market discipline. This third pillar thus encouraged prudent management and provided a mechanism whereby the market could reward well managed banks and penalise poorly managed banks.

$$\text{Basel 2 Capital Ratio} = \frac{\text{Tier 1 capital} + \text{Tier 2 capital} + \text{Tier 3 capital}}{\text{Credit risk} + \text{Market risk} + \text{Operational risk}} > 8\%$$

Post the introduction of Basel I, there had been significant developments both in the practice of measuring risks and in the financial instruments banks utilised to mitigate risks. A closer relationship between the risk and the capital required became necessary and Basel II provided this. Overall Basel II was a far more comprehensive approach to regulating bank capital than the “one-pillar” approach adopted in Basel I.

#### Pillar 1

As mentioned above, Pillar 1 set about the minimum capital requirements, based on the Basel 1 capital ratio, for credit, operational and market risk. Other risks were not considered. To evaluate each risk category, Basel II proposed the following options:

Credit Risk	Market Risk	Operational Risk
Standardised approach	Standardised approach	Basic indicator approach
Internal rating approach (IRB)	Internal Value at Risk (VAR) model approach	Standardised approach
Advanced internal rating approach (A-IRB)		Advanced measurement approach (internal forecasting)

**Table 2.1: Basel II, Pillar 1 evaluation methods. Source: BIS, Basel II (2006).**

Pillar one prescribed that the total capital ratio must not be less than 8% of risk-adjusted assets.

## Pillar 2

The second aspect of the framework provided recommendations for supervisory review and internal controls. Pillar 2 requires regulators to ensure that the capital requirements of Pillar 1 are adhered to. Furthermore regulators are expected to evaluate the appropriateness of banks internal controls.

## Pillar 3

Pillar 3 developed disclosure requirements to enhance transparency. Banks are expected to disclose information around their internal risk management systems as well as information regarding how Basel II is being implemented.

Danila (2012:131) noted that Basel II was an important step forward in risk sensitive capital regulation. According to him it created clear and strong links between calculation rules for capital adequacy standards, market supervision and market discipline. Despite this, Danila (2012:131) concludes that Basel II was not able to strengthen the banking system enough in order for it to respond to the challenges of the financial crisis. Rather the financial crisis highlighted the shortcomings of Basel II - the “lack of macro variables, procyclicality, liquidity risk improperly addressed and trading book related issues. Excessive reliance on external ratings and incorrect internal rating models also allowed for artificial reduction of capital requirements and decrease of banks’ capacity to withstand systemic crises.” As with the case with the first accord, Basel II revealed several negative impacts upon implementation and exposed certain limitations. Below I have discussed some of the major shortcomings of Basel II.

It is widely accepted that banking is a procyclical industry (Borio, Furfine and Lowe, 2001:11; Enria *et al.*, 2004). Specifically during downturns, banks limit credit supply which intensifies the downturn. Procyclicality can be explained as an underestimation or overestimation of risks which leads to high growth in upturns and risk aversion during downturns. A substantial amount of literature has addressed the procyclicality effects of the Basel Accords and general capital requirements. Borio, Furfine and Lowe (2001) found evidence of procyclicality in the Basel II capital requirements, resulting in a destabilising impact on the banking system. Kashyap and Stein (2004), Jokipii and Milne (2008) and Enria *et al.* (2004) found that capital requirements may lead to procyclical

behaviour, reducing the supply of loans by banks particularly in times of recession. Basel I and II has therefore been criticised for contributing to procyclicality within the banking sector instead of controlling it.

The procyclicality of credit ratings has also been addressed by various pieces of literature and Basel II criticised for too much emphasis on external ratings. The 'standard approach' to credit risk differentiates assets according to riskiness provided by an external credit risk agency's assessment. Bangia *et al.* (2002) highlighted the procyclicality of credit quality changes by showing that estimated credit losses were much higher in a contraction relative to an expansion. Altman and Saunders (2001) demonstrated that external ratings and hence the standardised approach component of Basel II would likely be procyclical. Danielsson *et al.* (2001:12) suggested that credit ratings may not be a convincing reflection of risk. Furthermore the use and dependence on external ratings created a conflict-of-interest situation for rating agencies. Rating analyses generated high fees for the ratings agencies from banks who wanted favourable ratings. Banks were able to either pressurise or shop around for favourable ratings for their instruments. Atik (2011:751) highlighted this fact and mentioned that high ratings benefit both the asset issuers and purchasers. Issuers wanted high ratings to increase the asset sale prices and marketability while purchase's, like banks, wanted high ratings in order to hold less capital under Basel II.

By the end of 2008, the G-10 agreed on the importance of the need to address the procyclicality issue in financial markets regulations and supervisory systems. They called upon the International Monetary Fund (IMF), the Financial Stability Board (FSB), and the Basel Committee on Banking Supervision (BCBS) to find ways to alleviate procyclicality.

Another shortcoming of Basel II worth noting was the use of the Value-At-Risk (VAR) models. Danielsson *et al.* (2001:4) asserts that "VAR is a misleading risk measure when the returns are not normally distributed, as is the case with credit, market and in particular operation risk. Moreover it does not measure the distribution or extent of risk in the tail, but only provides an estimate of a particular point in the distribution. Existing VaR models generate imprecise and widely fluctuating risk forecasts." This is ignored in Basel 2.

A criticism held against Basel II was that that liquidity risk is not adequately addressed and could be considered an afterthought. Liquidity risk is named as a direct risk in Pillar 2 of the Basel 2 framework. Danila (2012:131) highlights the fact that liquidity risk is improperly addressed by the Basel II framework on both the financing side and individual asset liquidity.

Furthermore Basel 2, in a similar vein to Basel I, it was not designed for emerging markets. Give this, Balin (2008:13) discusses several possible adverse effects for emerging market economies. Balin mentions the pressures placed on emerging market regulators due to the costs and skills involved in implementing Basel II. He also discusses several drawbacks with regards to the use of external ratings. Those who can afford rating agencies are confronted with unfavourable ratings due to uncertainty in accounting practices and bank regulations.

### **2.2.3 Global Financial Crisis**

The Global Financial Crisis coincided with the phase-in period of Basel II and raised serious questions around global regulatory and supervisory frameworks. With the failure of many banks and financial institutions, financial regulation and in particularly Basel II took some of the blame.

Both Basel I and Basel II, as highlighted in the shortcomings above, were not comprehensive enough to prevent risks stemming from banks' exposure to certain instruments such as securitizations. Furthermore the accords did not take into account the systematic risk present in the financial system. Many of the financial institutions that had to be bailed out with public funds in 2008 and 2009 in Europe and in the United States were Multinational Banks (Navaretti, *et al.*, 2010:3). Dermirguc-Kunt, Detragiache and Merrouche (2013) importantly reported that many of the banks that were rescued (bailed out) as a result of the crisis, were in compliance with minimum capital requirements shortly before and during the crisis. However many banks as well as non-financial institutions were highly leveraged and did not hold sufficient liquidity buffers. Blundell-Wignall and Atkinson (2010) stated that the regulated banking industry and the high leverage of banks was a major contributor to the financial crisis.

The global financial crisis developed from the subprime crisis, into the credit crisis, then into a financial crisis and finally became a global financial crisis (De Jager, 2014:101). The crisis is often described as the bursting of the housing market bubble in late 2007 which through a sequence of events resulted in the collapse of Lehman Brothers in 2008. What started as a crisis in one sector of the US economy in 2007 blew up into a worldwide financial crisis by late 2008. This can be viewed as proof of the high degree of interconnectedness in the financial system stressed in section 2.1 of the literature review. The global financial system and its financial institutions essentially have no borders. The crisis exposed shortcomings in the management of market liquidity and banks' funding, with significant consequences for system-wide financial stability (Gobat *et al.*, 2014:3).

Claessens and Kodres (2014:6) list a few common causes of the crisis as a credit boom; a rapid asset price appreciation in the housing market; the creation of new instruments whose returns rely on continued favourable economic conditions (e.g. structured credit products) and financial liberalisation and deregulation (or alternatively regulation which relied on banks internal risk management models).

It is obvious that no one factor in isolation was the cause of the global financial crisis but as can be expected regulation received much of the criticism. A study by Caprio *et al.* (2008) showed that the main reason for the subprime crisis was a failure of regulators and supervisors in various countries. The turmoil in the financial markets caused by the crisis demonstrated that regulatory and governance systems often fail to promote sound banking (Reisen, 2008). As mentioned in section 2.1 of this literature review, bank regulation is fundamental to crisis prevention. The global financial crisis therefore encouraged a revamp of financial regulation and in particular a review of bank regulation. Calomiris (2009:15) stressed that the need for policy reform should include macro prudential regulation as well as the strengthening of capital and liquidity rules. Amongst other factors there were widespread calls for the banking sector to hold more capital against their risk weighted assets and increase liquidity reserves in order to better absorb losses. With this Basel III, a new accord encompassing a new set of capital adequacy and liquidity measures as well as the inclusion of macro-prudential measures, was born.

The BIS validates the strengthening of the new standards by expressing that one of the main reasons for the crisis was the banking sectors excessive leverage. This was accompanied by a gradual erosion of the level and quality of the capital base. Furthermore banks were holding insufficient liquidity buffers. The banking system therefore was not able to absorb the resulting systemic trading and credit losses. The crisis was further amplified by the interconnectedness of systemic institutions. Eventually the market lost confidence in the solvency and liquidity of many banking institutions (BIS, December 2010, revised June 2011:1).

### **2.2.4 Basel III**

As discussed above, the global financial crisis raised serious question marks around Basel II and bank regulation. In response to the many issues raised, financial regulators enhanced and developed new rules and regulations. In December 2010, the BCBS approved the Basel III Accord, effective 2013. Basel III is a global regulatory standard on bank capital adequacy, stress testing and market liquidity risk agreed upon by the members of the Basel Committee on Banking Supervision. The approach's adopted by Basel I and II were almost completely firm-specific and microprudential. The new accord introduces a system wide approach at the macroprudential level with the introduction of new measures as well as improving many aspects of Basel II relating to capital requirements and risk coverage. Herve Hannovn, Deputy General Manager at BIS, highlights this as the fundamental change in Basel III in a speech on Basel III in November 2010. The changes from Basel II to Basel III can be split into 3 main categories; capital adequacy ratio, new liquidity measures and a macroprudential approach to banking regulation – this is summarised below.

#### *Capital Adequacy Ratio*

As stated earlier, Basel I implemented a risk-weighted capital requirement at eight percent, with total capital divided 50/50 between Tier 1 and Tier 2. Basel II more or less adopted the same measure. Basel III adopted several changes to the capital

requirement (the ratio itself), the definition of capital (the numerator) as well strengthening the risk coverage (the denominator).

The total capital ratio remains 8% of risk-weighted assets (RWA), however Basel III significantly increases the quality of capital (numerator of ratio). Under the previous accords, capital consisted of various subsectors and a complex set of minimum and maximum requirements. Basel III stresses the importance in the composition and quality of capital and thus breaks down Tier 1 capital into two categories: “Common Equity Tier (CET) 1” and “Additional Tier 1.” The new definition places a strict emphasis on CET1 (includes common shares and retained earnings) which is viewed as a high quality capital base, specifically required during crises. Basel III introduces stricter requirements for determining Additional Tier 1 capital to ensure these instruments absorb losses on a going concern basis. Tier 2 capital continues to provide loss absorption on a “gone concern” basis and mostly consists of subordinated debt. It has however been reduced from three and a half percent in Basel II to two percent in Basel III. Tier 3 capital is completely eliminated under the new definition.

Basel III places a restriction on instruments that qualify as Tier 1 and Tier 2 capital and has also abolished the breakdown of Tier 2 capital into upper and lower tiers. CET1 consists of; common shares issued by banks (that meet certain criteria), share premium, retained earnings, other comprehensive income, minority interests in the common shares of consolidated subsidiaries and certain regulatory adjustments. The following are deducted from CET1: goodwill and intangibles; any increase in equity capital resulting from a securitisation transaction; pension and deferred tax assets; cash flow hedge reserve that relates to the hedging of items that are not fair valued; bank’s investment in its own shares; and cumulative gains and losses to changes in own credit risk on fair valued financial liabilities. With respect to minority interest the net income of the third party minorities cannot be retained by the parent as common equity. Additional Tier 1 capital elements include: instruments meeting the criteria for inclusion in additional Tier 1 capital but not included in CET 1, share premium from the issue of instruments included in additional Tier 1 capital, instruments issued by consolidated subsidiaries and held by third parties that meet the criteria for inclusion in additional Tier 1 capital but not included in CET 1 and regulatory adjustments applied in the calculation of additional Tier 1 Capital. Tier 2 capital is defined as: instruments that meet the criteria for inclusion in Tier 2 capital but not included in Tier 1 Capital, share premium from the



issue of instruments included in additional Tier 2 capital, instruments issued by consolidated subsidiaries and held by third parties that meet the criteria for inclusion in Tier 2 capital but not included in Tier 1 capital, certain loan loss provisions and regulatory adjustments applied in the calculation of Tier 2 capital.

With respect to the denominator of the capital ratio, Basel III improves the risk coverages. New rules as well as modifications to previous ones were made to determine capital charges. This is specifically intended to correct the underestimation of risks which contributed significantly to the financial crisis. There is a strong focus on counterparty credit risk (CCR) and the reliance on external credit ratings. Basel II provided two approaches to measuring credit risk; the standardised approach (reliant on external ratings) and the internal ratings based approach. Basel III makes changes to both of these approaches specifically in relation to securities financing transactions and over-the-counter (OTC) derivatives.

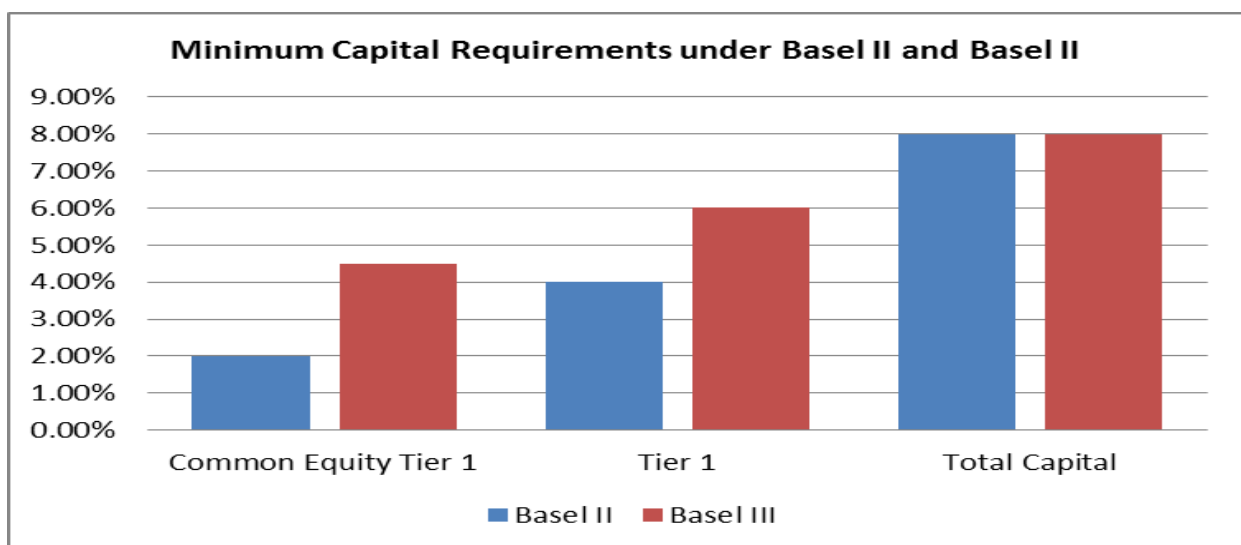
The Reserve Bank of New Zealand (2012:3) summarise the new requirements pertaining to enhanced risk coverage consisting of the following:

- A charge for mark-to-market CCR called credit valuation adjustment,
- An asset value correlation multiplier for exposures to unregulated and large financial institutions,
- The strengthening of margining and collateral management requirements and more conservative regulatory haircuts for securitisation collateral,
- A requirement to include stressed market data when calculating the probability of default of highly leveraged counterparties,
- Identification and management of wrong way risk, and
- A two percent weight for exposures to central counterparties.

The Basel III Total Capital (Tier 1 plus Tier 2 Capital) must be at least 8% of risk-weighted assets at all times. CET1 increases from 2% to 4.5% of risk-weighted assets under Basel III. The Additional Tier 1 capital ratio is 1.5% therefore raising Tier 1 Capital from 4% to 6%. Basel III introduces a capital conservation buffer (that did not exist under Basel II) of 2.5% of Common Equity Tier I capital. This implies banks will need to maintain a minimum CET1 ratio of 7%.

The underlying rationale for the capital conservation buffer (and in fact the countercyclical buffer which is discussed later), is that banks increase capital during periods of strength and draw down when unexpected losses occur. Banks that do not meet the capital conservation buffer requirement are required to retain a percentage of dividend payments, share buy-backs, and staff bonus payments prior to regulatory deductions (Bank for international settlements, 2011a:54).

Figure 2.1 below presents the minimum capital requirements under Basel II and Basel III (excluding the conservation and countercyclical capital buffers).



**Figure 2.1: Minimum capital requirements comparison between Basel II and Basel III. Source: Babic (2011:147).**

The capital ratio under Basel III therefore does not only increase the CET1 requirement but the improved definition of capital and enhanced risk coverage further enhances the effect of the changes. These ratios are to be phased in by January 2019. According to Delimatsis (2012:12) the new and enhanced capital buffers (especially to Tier 1) will mitigate the effect of procyclicality in the banking sector.

Basel III provides a phase in period for the new capital requirements. The minimum CET 1 and Tier 1 requirements came into effect between 1 January 2013 and 1 January 2015 while the capital buffers will come into effect between 1 January 2016 and 1 January 2019. Capital instruments that do not meet the new regulations but are currently being used are being phased out over a 10 year period beginning in 2013.

## *Liquidity Standards*

One of the more prominent additions introduced by Basel III were liquidity measures as a reactive stance to the global financial crisis. Financial Institutions are now required to maintain liquidity buffers, a new requirement not stipulated under Basel II. The Accord was revised in January 2013, with new provisions regarding the size, composition and availability of liquidity buffers. The Basel III liquidity framework proposes two liquidity ratios: The Leverage Coverage Ratio (LCR) and the Nets Stable Funding Ratio (NSFR). According to a study by Yan *et al.* (2011), the new liquidity regulations will lower the probability of future banking crises and associated losses of economic output.

The LCR is designed to measure a bank's resilience over a thirty day stress period where some classes of creditors suddenly withdraw from credit markets. The LCR is the ratio of the value of an institution's stock of high-quality liquid assets to an estimated value of the total, net cash outflow from the institution, in a hypothetical stress scenario lasting 30 calendar days (Bank for International Settlements, 2010a).

$$\text{LCR} = \frac{\text{Stock of high quality liquid assets (HQLA)}}{\text{Total net cash outflows over the next 30 calendar days}} > 100\%$$

This ratio is required to be above 100% and Basel III lists the assets that can be included in the numerator of the formula. These assets were initially divided into two groups, namely Level 1 and Level 2. The 2013 Accord amendment split Level 2 into Level 2A and 2B.

Level 1 assets generally include cash, central bank reserves, and certain marketable securities backed by sovereigns and central banks, among others. These assets are generally considered the highest quality and the most liquid, and there is no limit on the extent to which a bank can hold these assets. Level 2A assets include, for example, certain government securities, covered bonds and corporate debt securities. Level 2B assets include lower rated corporate bonds, residential mortgage backed securities and equities that meet certain conditions (Bank for International Settlements, 2013). Level 2 assets may not exceed 40% of total HQLA and Level 2B assets may not exceed 15% of HQLA.

Total net cash outflows is defined as the sum of outflows over the next thirty days minus the lesser of contractual inflows and 75% of outflows. This also includes off-balance sheet outflows. The LCR therefore forces a firm to hold liquid assets equal to at least 25% of its projected outflows (Hartlage, 2012:464).

The NSFR standard was developed to promote medium and long-term funding stability. The NSFR is the ratio of available stable funding (ASF) to required stable funding (RSF):

$$NSFR = \frac{\text{Available amount of stable funding (ASF)}}{\text{Required amount of stable funding (RSF)}} > 100\%$$

$$\frac{\text{Equity + Liabilities (> 1 year)} + \text{Stable Deposits (< 1 year)} \times 0.9\% + \text{Other Deposits} \times 0.8\% + \text{ST Debt} \times 0.5\%}{\text{Gov Debt} \times 0.05\% + \text{Corp Loans (< 1 year)} \times 0.5\% + \text{Retail Loans (< 1 year)} \times 0.85\% + \text{Mortgages} \times 0.65\% + \text{Other} \times 100\%}$$

The NSFR promotes funding stability in limiting a banks reliance on short-term wholesale funding. Stable funding includes customer deposits, long-term debt and equity and excludes short-term wholesale funding. To comply with the NSFR, banks must have ASF greater than their RSF and therefore will pursue strategies either to increase their ASF or decrease their RSF.

The NSFR definition uses the Basel III capital rules thereby inheriting some of the shortcomings of capital rules. As an example, the pro-cyclical impact of fair value changes of financial assets on Tier 1 capital can be transferred to the NSFR. This increases the pro-cyclicality of liquidity measures (Song, 2014:5). Distinguin *et al.* (2013) discovered that banks with lower NSFR ratios will also have lower regulatory capital ratios. Furthermore Dietrich *et al.* (2014) found that banks that have strong NSFR ratios also tend to have strong regulatory capital ratios.

The premise supported by the liquidity regulation is that an increased holdings of high quality liquid assets should reduce banks risk (Allen and Gale, 2004:5), however these expected benefits would not be achieved if banks increased the riskiness of their other asset holdings (Wagner, 2007).

King (2013:4144) in his study on banks in the U.S, Japan and three emerging market countries finds that the most cost-effective strategy to abide by the NSFR is to hold more higher-rated securities and to extend the maturity of wholesale funding. These changes will reduce net interest margins (NIM).

According to Kowalik (2013:80) the new Basel III liquidity provisions are inflexible as they do not account for each institutions specific factors that determine their own ability to withstand a liquidity shock (e.g. the nature of an individual financial institution's risk profile, capital, and business activity). This raises the possibility that some institutions may be required to hold larger or smaller buffers than is actually necessary given the nature of their operations. He also argues that an inflexible approach could lead to 'regulatory arbitrage' as institutions may find strategies to exploit the loopholes in the Basel liquidity provisions.

It is important to note that even though the Basel III measures are revolutionary in terms of centralising liquidity regulation, many countries regulators already impose some sort of liquid asset requirement. The Basel III LCR and NSFR are a lot more comprehensive though. Table 2.2 below presents the liquidity measures requirements over the official Basel phase in period to 2019.

	2013	2014	2015	2016	2017	2018	2019
LCR	Bank Disclosure Starts		60% Minimum Standards	70% Minimum Standards	80% Minimum Standards	90% Minimum Standards	100%
NSFR	Bank Disclosure Starts					100%	100%

**Table 2.2: Basel III liquidity ratios implementation timeline. Source: Standard Bank Group Risk Report (2013).**

As global liquidity measures are new, the Basel III LCR and NSFR are likely to have the biggest impact on banks or at the least be one of the main concerns for bankers. Dietrich

*et al.* (2014) in a study on 921 Western European banks found that the majority of banks have historically not met the NSFR minimum requirements between 1996 and 2010.

### *Systemic risk-based approach (Macro-prudential)*

The global financial crisis illustrated the failure of Basel II to incorporate macroprudential measures in an inherently unstable banking system. Basel III sets about incorporating macroprudential regulation. According to Freixas *et al.* (2015:42) there exists an emerging consensus that macroprudential policies are required for financial stability and can curtail credit booms and excessive risk-taking by financial intermediaries

### Leverage Ratio

Prior to and during the financial crisis many banks had adequate capital ratios but had built up excessive leverage. Excessive leverage by banks is viewed by many as one of the contributing factors to the global financial crisis (FSB, 2009:15). The Basel Committee therefore introduced the Leverage Ratio to supplement the minimum capital requirements. The ratio has been added by the BCBS in response to the criticism of the previous frameworks' reliance on banks' own internal models in setting capital requirements. The BIS (2011a:4) argues that the leverage ratio requirement will help contain the build-up of excessive leverage in the banking system, as occurred during the global financial crisis. The ratio will help with attempts to game the risk based requirements and also help address model risk. The proposed leverage ratio is calculated by comparing Tier 1 capital with total exposure (Bank for International Settlements, 2011a:61).

$$\textbf{Leverage Ratio} = \frac{\text{Tier 1 capital}}{\text{Total exposure}} > 3\%$$

The leverage ratio is a measure of a bank's Tier 1 capital as a percentage of its assets (including off-balance sheet exposures). The requirement has been set at 3% and the appropriateness of this level and final adjustments to the definition will be assessed and finalised by 2017. The leverage ratio, along with public disclosure requirements, is applicable from 1 January 2015.

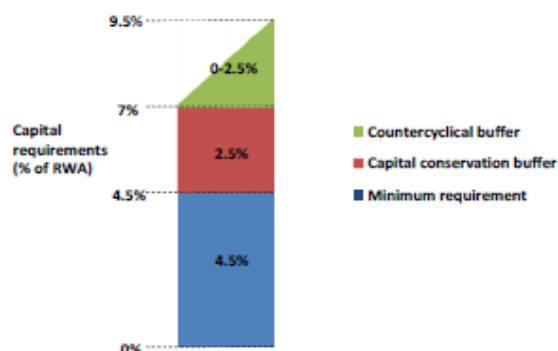
The BIS (2014:2) defines a bank's total exposure (denominator) as: a) on-balance sheet exposures; b) derivative exposures; c) securities finance transactions (SFTs), including repurchase agreements, reverse repurchase agreements and margin lending transactions; and d) off-balance sheet exposures, such as commitments, guarantees and standby letters of credit.

Off-balance sheet exposures often are a source of significant leverage and therefore the BCBS has instructed banks to include them in the denominator of the leverage ratio.

According to D'Hulster (2009:4) one of the leverage ratio's benefits is its simplicity. He states that it can be adopted quickly, doesn't have a huge cost implication and doesn't require any significant expertise from banks or their supervisors. Furthermore, the leverage ratio can be applied regardless of the capital adequacy regime in a jurisdiction.

### Countercyclical Capital Buffer

A second capital buffer, the countercyclical capital buffer, has been introduced by Basel III as a macro-economic approach in an attempt to diminish the effect of procyclicality. The buffer will range between 0% and 2.5% of CET1 and will be determined by the regulator in each jurisdiction. According to the BIS (2015:1), the countercyclical buffer aims to ensure that the banking sector capital requirements take account of the macro environment. See figure 2.2 below for an illustration.



**Figure 2.2: Relationship between the minimum CET1 requirement and buffers. Source: Juks and Melander (2012).**

According to Juks and Melander (2012:8) this buffer targets systematic risks that traditional microprudential regulation could not detect. They highlight the fact that this buffer on a macro basis deals with risks present in the entire financial system. The proposal for the buffer (before it was incorporated in the Basel III document) by the Basel Committee in July 2010 was justified to achieve the macro-prudential goal of protecting the banking sector from periods of excess credit growth that have often been associated with the build-up of systemic-wide risk.

The buffer will be phased in together with the capital conservation buffer between 1 January 2016 and the end of 2018. It will become fully effective on 1 January 2019.

## **2.3 South Africa Banking Regulation**

The South African Reserve Bank (SARB), established in 1921, is the central bank of South Africa and is responsible for banking regulation. The SARB is also responsible for upholding the effective application of international regulatory and supervisory standards. The SARB monitors bank activities in terms of either the Banks Act, 1990, or the Mutual Banks Act, 1993. Other than the SARB, regulators involved in banking supervision in South Africa include the Financial Services Board (FSB), the Financial Intelligence Centre (FIC) and the National Credit Regulator (NCR). Each of these authorities are governed by Acts.

Prior to the 1980's, South Africa's bank capital requirements were based on simple ratios of capital to total assets and off-balance sheet activities and derivatives were unregulated. The implementation of the Banking Act of 1990, based on Basel rules, was the important step in manoeuvring South African bank regulation in accordance with international standards.

South Africa is now widely considered to have an advanced and sound banking system. A report by the International Monetary Fund (IMF) published in October 2008 observes that South Africa has a well-diversified and refined financial system that is supported by an effective regulatory framework as well as a developed financial and legal infrastructure. Furthermore, the World Economic Forum rated South African banks second in the world for soundness in 2012 (World Economic Forum, 2012).



It is noteworthy that South Africa was not severely affected by the global financial crisis. The SARB was not forced to alter its monetary operations following the onset of the crisis as was not the case for many other central banks globally. South Africa's domestic money market rates hardly changed at the time when Libor rates increased significantly. Overall, the local interbank market functioned effectively. Furthermore South African banks' leverage was rather low in comparison to other jurisdictions (SARB, 2009:4). According to the SARB (2007:4) one of the main reasons South African commercial banks were not severely affected was due to the fact that they had no direct exposure to the sub-prime mortgage market. Due to the aforementioned facts no changes to regulation in South African were prescribed other than those by the Basel Capital Accord post the financial crisis.

South Africa belongs to the G-20 group of countries and is a member of the Basel Committee. The SARB actively participate in Basel Accords and compliance. Banking Regulation in South Africa has recently been amended to accommodate Basel III. The implementation of the Basel III framework is being phased in, having commenced on 1 January 2013 and will follow the timelines determined by the Basel Committee. Figure 2.3 below extracted from Nedbank's Risk Report details the minimum capital requirements for South Africa on the Basel phase in timetable.

Classes of capital <sup>4</sup>	Basel II.5 2012	Basel III 2013	Basel III 2014	Basel III 2015	Basel III 2019
<b>COMMON EQUITY TIER 1 (CET1) RATIO</b>					
Minimum CET1		3,50	4,00	4,50	4,50
Pillar 2A/D-SIB for CET1 <sup>1</sup>		1,00	1,50	2,00	2,00
Minimum CET1 plus Pillar 2A/D-SIB for CET1		4,50	5,50	6,50	6,50
Capital conservation buffer <sup>2</sup>					2,50
<b>TOTAL CET1 (excluding Pillar 2B<sup>3</sup> and countercyclical buffer)</b>	<b>5,25</b>	<b>4,50</b>	<b>5,50</b>	<b>6,50</b>	<b>9,00</b>
Countercyclical buffer (assume maximum percent, if imposed) <sup>2</sup>					2,50
<b>Total CET1 (excluding Pillar 2B<sup>3</sup>, including maximum countercyclical buffer in 2019)</b>	<b>5,25</b>	<b>4,50</b>	<b>5,50</b>	<b>6,50</b>	<b>11,50</b>
<b>ADDITIONAL TIER 1 (T1) RATIO</b>					
Minimum additional T1	1,75	1,00	1,50	1,50	1,50
Pillar 2A/D-SIB for T1 <sup>1</sup>		0,50	0,00	0,00	0,50
<b>TOTAL T1 RATIO (excluding Pillar 2B<sup>3</sup>, including maximum countercyclical buffer in 2019)</b>	<b>7,00</b>	<b>6,00</b>	<b>7,00</b>	<b>8,00</b>	<b>13,50</b>
<b>SUMMARY OF TOTAL CAPITAL RATIO</b>					
Minimum Total Capital	8,00	8,00	8,00	8,00	8,00
Pillar 2A/D-SIB for Total Capital <sup>1</sup>	1,50	1,50	2,00	2,00	3,50
Minimum Total Capital plus Pillar 2A/D-SIB for Total Capital	9,50	9,50	10,00	10,00	11,50
Capital conservation buffer <sup>2</sup>					2,50
<b>TOTAL CAPITAL RATIO (excluding pillar 2B<sup>3</sup> and countercyclical buffer)</b>	<b>9,50</b>	<b>9,50</b>	<b>10,00</b>	<b>10,00</b>	<b>14,00</b>
Countercyclical buffer (assume maximum percent, if imposed)					2,50
<b>Total capital ratio (excluding pillar 2B<sup>3</sup>, including maximum countercyclical buffer<sup>2</sup>)</b>	<b>9,50</b>	<b>9,50</b>	<b>10,00</b>	<b>10,00</b>	<b>16,50</b>
Capital instruments that are not Basel III compliant and no longer qualify as Additional Tier 1 or Tier 2 capital	Phased out over 10-year horizon beginning 2013				

<sup>1</sup> The aggregate requirement for Pillar 2A and D-SIB will not exceed 2,0% for CET1, 2,5% for Tier 1 and 3,5% in respect of the Total capital adequacy ratio (CAR). SARB will advise banks of their D-SIB surcharge in 2013.

<sup>2</sup> The capital conservation buffer together with the countercyclical buffer will be applied at CET1 level and will also be required to be met at both a Total Tier 1 and Total capital level. The countercyclical buffer will only be applied when the SARB deems there to be excessive credit growth in the system, not expected for the foreseeable future.

<sup>3</sup> Any bank specific Pillar 2B add-on is at the sole discretion of the SARB, and may not be disclosed to the public. Any Pillar 2B add-on is allocated 50% to Total CET1, 75% to Tier 1 and 100% to Total and Nedbank's new Basel III target ranges include a conservative add-on for any Pillar 2b.

<sup>4</sup> All dates are as of 1 January.

**Figure 2.3: South African Basel minimum requirements. Source: Nedbank Group Limited Risk Report (2012).**

According to De Jager (2015:59) current bank regulation in South Africa is comparable with developed nations that subscribe to the Basel Accords. A 2015 IMF published report found that South Africa has a high level of compliance with the Basel Core Principles for Effective Banking Supervision. The report noted that the SARB had made significant improvements since the last assessment five years prior. In relation to the Basel Principles, South Africa was found to be compliant with Principle 24 on liquidity risk (Bank for International Settlements, 2015).

In May 2012, the SARB released Guidance Note G5/2012 approving the provision of a committed liquidity facility (CLF) that will assist banks in meeting the LCR in terms of Basel III. While designing the LCR rules, it was evident that certain jurisdictions do not have sufficient HQLA for their banking system to meet this new requirement. In these jurisdictions (South Africa as an example), the regulation allows the central bank the option of providing contractual committed liquidity facilities that contribute toward a bank's stock of liquid assets (Bank for International Settlements, 2013:22). The facility is capped at 40% of any particular bank's net outflows under stressed scenarios. The SARB has adopted the use of the CLF as a substitute for Level 2A assets and has issued various guidance notes and other documents on the matter. The CLF is available to all banks from 1 January 2013 (SARB, 2012:19). South Africa's use of the CLF makes it difficult to draw extensive conclusions from previous research on the important liquidity components of Basel III.

While the Basel III liquidity ratios are new, liquidity regulation imposed by the SARB is not. South African banks have been subject to national liquidity requirements prior to the introduction of the LCR and NSFR. The national liquidity measure is known as the liquid asset requirement and is disclosed on a monthly basis. The new Basel III LCR became legally binding for all South African banks in 2015 and will follow the official phase in period presented in Table 2.2.

The South African banking sector is characterised by high concentration. The largest five banks constitute 91% of the total banking assets in South Africa (Bank for International Settlements, 2015:7). As at the end of December 2014, there were 31 banking institutions reporting data to the SARB. The South African banking system had total assets of ZAR 4,178,699 million, or 107.1% of Gross Domestic Product (GDP).

### ***2.3.1 Risk reports of the big five South African banks***

Of all the significant changes under Basel III (summarised in 2.2.4 above), this study on the South African banking sector focuses on the tighter capital requirements and more importantly, the impact of the new liquidity ratios. The reason for the importance of the liquidity measures over the capital measures stems from the fact that from a South African perspective, the major banks and the banking sector in general are well

capitalised. This was also one of the factors which assisted the South African banking industry from the global financial crisis.

Table 2.3 and 2.4 below details the Tier 1 and Total capital ratios of South Africa's top 5 banks obtained from their respective risk and annual reports. The tables highlight the healthy capital position of the major South African banks (Also illustrated in Figure 2.4).

2012 (BASEL II)	Total Tier 1 Ratio	Total Capital Ratio	Total RWA (R'm)
Standard Bank Group	11.70%	14.60%	789 613
Standard Bank SA	11.30%	14.80%	499 819
FirstRand <sup>1</sup>	13.20%	14.70%	471 468
FirstRand Bank	12.60%	14.60%	364 435
Barclays Africa Group	14.00%	17.50%	438 216
ABSA Bank Limited	13.70%	17.50%	385 855
Nedbank Group	12.90%	14.90%	359 658
Nedbank Limited	12.90%	15.30%	313 638
Investec Limited <sup>2</sup>	11.60%	16.10%	192 376
Investec Bank Limited	11.40%	16.10%	184 253

1 FirstRand year end of June 2012

2 Investec year end of March 2012

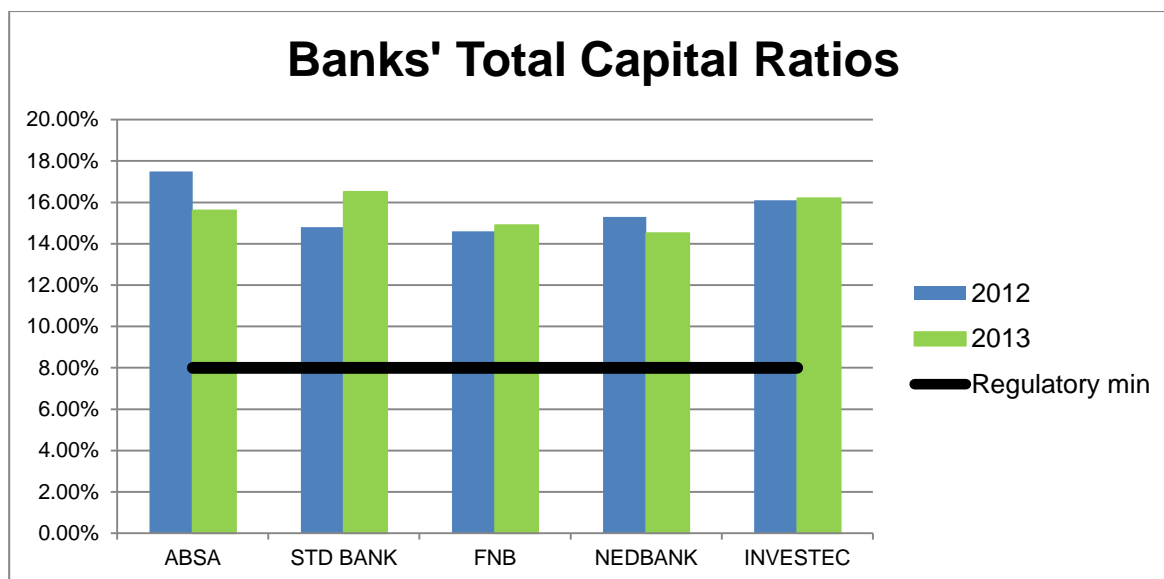
**Table 2.3: South African banks capital ratios 2012 (Basel II). Source: Company's Annual Reports and Risk Reports (2012).**

2013 (BASEL II)	Total Tier 1 Ratio	CET Ratio	Total Capital Ratio	Total RWA (R'm)
Standard Bank Group	13.20%	12.60%	16.20%	841 272
Standard Bank SA	12.80%	12.80%	16.50%	489 045
FirstRand <sup>1</sup>	14.80%	13.70%	16.20%	535 410
FirstRand Bank	13.30%	12.60%	14.90%	403 464
Barclays Africa Group	13.00%	11.90%	15.60%	560 865
ABSA Bank Limited	12.00%	11.00%	15.60%	405 942
Nedbank Group	13.60%	12.50%	15.70%	392 926
Nedbank Limited	12.10%	10.70%	14.50%	336 858
Investec Limited <sup>2</sup>	10.80%	8.90%	15.50%	223 865
Investec Bank Limited	10.90%	10.30%	16.20%	217 715

1 FirstRand year end of June 2013

2 Investec year end of March 2013

**Table 2.4: South African banks capital ratios 2013 (Basel III)**



**Figure 2.4: Major South African banks' capital ratios. Source: Company's Annual Reports and Risk Reports (2013).**

The graph above of the five South African banks' total capital adequacy ratio further illustrates the extent to which all are operating above the minimum Basel requirements. It displays the total capital adequacy ratio at 2012 under Basel II and then at 2013 under Basel III. The increased capital requirements under Basel III have hardly impacted the capital ratios of South Africa's major banks. It is also interesting to note that three (Standard Bank, FirstRand Bank and Investec) of the five banks experienced an increase in their capital ratios in 2013 after the adoption of Basel III.

The SARB annual report for 2012 confirms that the banking sector was adequately capitalised throughout 2012. Total Capital Adequacy Ratio (CAR) and Tier 1 CAR increased from 15.1% and 12.2% respectively as at 31 December 2011 to 15.9% and 12.6% respectively as at 31 December 2012. These figures were based on the Basel II framework (SARB 2012:46). The advent of Basel III on 1 January 2013 and the changes to the capital ratios did not adversely affect this situation. At the end of December 2013, the banking sector was still well capitalised at 15.6% despite the implementation of higher capital requirements under Basel III (SARB, 2013:1). This clearly indicates that the capital adequacy of the South African banking sector as a whole was well above the Basel III minimum requirements at the implementation point.

The BIS issued an update report on the Basel Committee member jurisdictions and bank's progress in meeting the Basel III measures in 2014. They state that in the second half of 2013, the average CET1 ratio of large international banks was 10.2% (Bank for International Settlements, 2014:5). As Table 2.4 above illustrates all of the five major South African banks had a CET1 ratio above the international average quoted by the BCBS, during the same period. Nedbank incurred the lowest CET1 ratio of the five banks with 10.7% still 0.5% above the average for international banks. This is further testament to the healthy capital position of the South African banking sector.

As the South African banking sector continues along the official Basel III implementation timeline, minimum required capital ratios will rise through to 2019. The additional capital buffers (capital conservation and countercyclical buffers) will also be phased in from 2016. Despite the strong capital position of the South African banking sector this rise in the minimum regulatory requirement will obviously present some pressures on their capital positions. The sector will need to prioritise capital planning taking into account the increasing requirements.

## **2.4 Regulation and Bank Profitability**

A significant amount of literature exists which argues that there could be significant costs associated with higher capital requirements. Calem and Rob (1999) suggest that increased capital regulation may result in excessive risk-taking behaviour by undercapitalised banks that in turn have unintended negative consequences on banks. Santos (2000) makes the argument that bank regulation, through higher capital requirements, negatively affects bank development and credit expansion by increasing fixed costs and operating costs. Claessens and Klingebiel (2000) present an argument for less bank regulation and suggest that fewer regulatory restrictions permits banks to efficiently utilize economies of scale and scope. A McKinsey (2010) study estimates that the ROE for the average bank will decrease by about 4% in Europe and about 3% in the United States (US) as a result of the implementation of Basel III.

Contrary to the above, some studies suggest that banks with high levels of capital perform better than undercapitalised banks. Abreu and Mendes (2001) suggest a positive impact of equity level on profitability. Goddard, Molyneux and Wilson (2004) also supports the finding of a positive relationship between capital/asset ratio and bank's earnings.

Finally a third view exists that bases a hypothesis on Modigliani and Miller's (MM) 1958 Irrelevance theory. According to MM (1958) theory, capital structure is irrelevant and therefore an increase in equity should have no effect on the value of a bank. Admati *et al.* (2013) set about highlighting why arguments that banks face increased costs with increased equity requirements is flawed. They argue that forcing banks to hold higher equity on their balance sheets is not socially expensive. Overall though, the literature on capital and bank profitability (with specific focus on Basel standards) suggests that the MM (1958) irrelevance position does not hold.

Liquidity was also an important factor during the global financial crisis as banks ran short of cash. This led to the liquidity measures introduced under Basel III. The relationship between liquidity and profitability is also a debatable topic much like capital and profitability. Theoretically speaking and assuming all else held equal, the LCR should reduce banks liquidity risk by increasing high quality liquid asset holdings or reducing outflows from the liability side. This should reduce banks profitability by holding more low yielding assets. Consistent with this notion is a study conducted on a sample of U.S. and Canadian banks by Bordeleau and Graham (2010) that finds that beyond a certain point, liquid assets reduce bank profitability. Angbazo (1997) find an increase in liquid assets reduces net interest margins of banks as a result of a lower liquidity risk premium. Molyneux and Thornton (1992) found a significant inverse relationship between liquidity and profitability. Similarly Goddard, Molyneux and Wilson (2004) found a negative relationship in a study on European banks. Furthermore King (2013:41444) found that in order for banks to meet the NSFR they have to hold more higher-rated securities and expand the maturity of wholesale funding which in turn reduces net interest margins.

Contrary to the above, Bourke (1989) in his study on European, North American and Australian banks found a positive relationship between liquid assets and bank profitability. This contradicts the generally accepted notion that low yielding liquid assets reduce profitability. In a slightly different outcome to both the above mentioned strands



of research on liquidity, Giordana and Schumacher (2012) find that the LCR has an insignificant impact on banks' profitability. The study was performed on Luxembourg banks.

## 2.5 Problem Statement

The changes to Basel III, specifically around tighter capital requirements and the new liquidity measures, are likely to impact banks' profitability. A substantial body of literature examining the impact of bank regulation does exist, but few studies model the impact of the Basel III capital and liquidity requirements on banks' profitability. The BIS themselves have conducted most of the Basel III analyses. Two examples are; *An assessment of the long-term economic impact of stronger capital and liquidity requirements* (Bank for International Settlements, 2010), and *Mapping capital and liquidity requirements to bank lending spreads* (King, 2010). In addition, several recent studies on the impact of Basel III measured the impact on lending rates while holding ROE constant or targeting a specific ROE. King (2010:2) mentions that to keep ROE unchanged, banks raise lending rates and this has been the focus of much recent literature. The BIS (2010b), Kashyap, Stein and Hanson (2010), Angelini, et al. (2011), and Slovik and Cournède (2011) have all contributed to literature on the impact of Basel III on lending spreads.

A second strand of recent literature on the impact of Basel III assesses macroeconomic factors, such as the impact on GDP. Vitek and Rodger (2012) measure the effect on various macroeconomic factors, such as GDP as a result of higher capital requirements. Their study was based on fifteen mostly advanced economies. De-Ramon, et al. (2012) use a model to estimate the total impact of Basel III on United Kingdom's (UK) GDP.

In the closest match to the research in this study, McKinsey & Company suggests that Basel III would reduce ROE for an average European bank by 4%, and 3% for an American one. The ROE decrease is expected to be gradual with the respective 4% and 3% declines expected in 2019 after the full Basel III phase in. The McKinsey study analysed 45 European banks along with the largest US banks and states that the fall in ROE mainly comes from the capital and funding impact. These two areas of Basel III are also primarily focused on by this study.

Conceptually speaking, an increase in capital requirement under Basel III should reduce ROE if banks do not adjust their behaviour. Furthermore, the liquidity ratios force banks to hold shorter term, lower yielding assets which, theoretically speaking, suggests that ROA should decrease. Furthermore, holding more high quality liquid assets should lower interest income and funding assets with longer maturity liabilities (required by NSFR) will increase interest expense. This should therefore result in net interest margins (NIM) declining.

Ultimately, the new capital and liquidity measures introduced under Basel III are expected to negatively affect bank profitability. Many industry experts, as well as the banks themselves (prior to 2013), have commented on the potentially significant impact on profitability by the new Basel III. The BIS mention that banks' adjustment to meet the higher capital and liquidity requirements will impact profitability and specifically NIM (Bank for International Settlements, 2016:28). Due to the relatively recent implementation of Basel III, very little research on actually measuring the effect on profitability of the banking sector has been conducted. Almost no research has been performed on the effect of Basel III on the profitability of the South African banking sector. This was established through an extensive search of online journals, Google Scholar and UCT library resources for Basel research on South Africa. Dr De Jager (Associate Professor at UCT) was also consulted on the matter. From a South African perspective, The Banking Association of South Africa (2016) developed a model to compute the Basel regulatory costs and demonstrate the changing cost structures due to the Basel Accords. The model displays a quantitative cost impact of regulation on certain asset products. The Banking Association of South Africa's model does not measure profitability of the banking sector and does not answer any pertinent questions around the profitability impact and banks' possible reaction to Basel III. This highlights the need for this particular study on the profitability impact of Basel III in South Africa.

Lastly, the BCBS, as at March 2016, also states that the only empirical studies performed on the Basel III liquidity regulation are based on the UK and Netherlands (Bank for International Settlements, 2016:32).

## **2.6 Research Question**

The primary research question that this study aims to address is:

- What is the impact of the change from Basel II to Basel III on the profitability of the South African banking sector, assuming banks' product pricing remains unchanged?

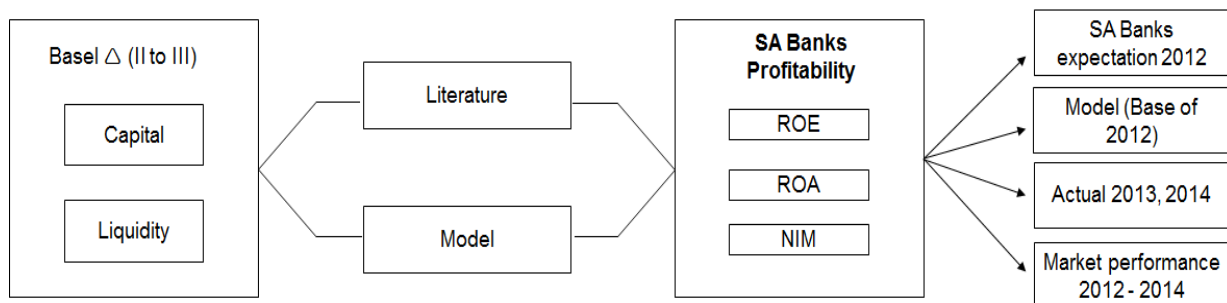
### 3 RESEARCH APPROACH

#### 3.1 Introduction

Using the current literature and previous bodies of research around the topic, this section articulates the overall research approach that answers the research question. The major South African banks used in the study are discussed, along with an analytical model generated based on bank profitability. The section also describes the data-collection process and the data analysis.

#### 3.2 Research Design

The research is exploratory in nature, using a combination of literature and analytical modelling. It builds on the research findings from related studies, as well as publicly available information on banks as detailed in the literature review. The overall research design for this study is depicted in Figure 3.1 below.



**Figure 3.1: Overall research design**

The study entails an analysis of bank data and information to determine the impact of the change from Basel II to Basel III on bank profitability. The approach adopted in this study is based on the method utilised by the BIS themselves in the King (2010) assessment on Basel III and lending rates. King (2010) adopted a methodology of creating a representative bank and then using accounting relationships. The same approach is used in this study.

The study uses triangulation by combining qualitative and various quantitative research methods in order to strengthen the validity of the findings and create a deeper understanding of the topic. As depicted in Figure 3.1, four sources of information have been used in order to provide confirmation and completeness, thereby reducing bias. Overall literature is used to formulate a model to address the topic and then the model output is compared to three different sources of information.

Firstly, a summary of each individual bank's expectation of the impact of the change from Basel II to Basel III is collated from their 2012 annual reports. Secondly, the collected data is used to generate an analytical model by creating a representative bank of the South African banking industry. Then, using an accounting approach the study measures the impact of the change from Basel II to Basel III on profitability, after which the banks' expectations and the modelled profitability are compared to the actual profitability of the generated representative bank for 2013 and 2014. Lastly, market performance data obtained from Bloomberg for the JSE Banking Index is used to corroborate the findings from the modelled profitability due to the Basel changes and the actual profitability of the representative bank. The constituents of the JSE Banking Index are Standard Bank, ABSA, FirstRand Bank, Nedbank and Capitec Bank. It therefore contains four of the five banks used in this study and is an appropriate representation of the market performance of the representative bank. According to the European Central Bank (2010:10), one of the most common market-based measures is the price-to-earnings ratio (PE ratio). The PE ratio of the JSE Banking Index is therefore used to compare against the findings of the modelled profitability and actual profitability findings of the representative bank.

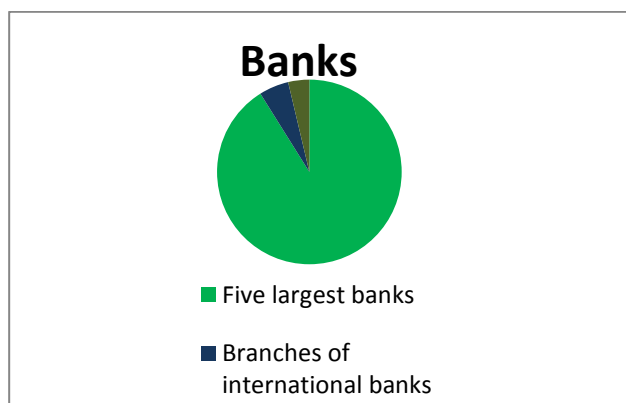
Two crucial aspects of the new regulatory framework are tighter capital requirements and new liquidity measures and the study thus concentrates on these areas. It is commonly understood that tighter capital and liquidity requirements can affect banks' behaviour (e.g. changing lending rates), and this has been assessed by many current studies, like King (2010), Slovik and Cournède (2011) and Swamy (2014). In so doing, they have either held ROE constant or targeted a specific ROE figure. A significant underlying assumption for this study, however, is that banks' behaviour is held constant while the effect on profitability is assessed.

### 3.3 Data Description

The area of focus for this study is the South African banking industry. The 31 December 2012 date is critical to the study as it marks the changeover to the latest Basel Accord. On this date, Basel II was replaced with Basel III. South Africa implemented Basel III on 1 January 2013. The study analyses the five largest banks in South Africa (according to market capitalisation), namely:

- Standard Bank
- ABSA Bank
- FirstRand Bank
- Nedbank
- Investec Bank Limited

These banks hold the majority of the South African banking assets. As at 31 December 2012 (the Basel changeover date), 91.1% of total banking assets were held by these five banks (SARB, 2012:38), as Figure 3.2 illustrates. These five are therefore deemed an adequate representation of the South African banking industry.



**Figure 3.2: Composition of total banking-sector assets. Source: SARB (2012).**

The following information was collected pertaining to the five banks as at 31 December 2012 (Basel II) and 31 December 2013 (Basel III):

- Net income, average total assets, risk weighted assets, average total equity and breakdown of equity.
- Basel ratios (capital, liquidity and leverage ratios).
- Assets and liabilities maturity analysis (where available).

Secondary data was collected from the five banks' annual reports and interim reports for the quantitative aspect of the study. Data pertaining to bank profitability as well as the actual Basel ratios is sourced from the various banks' annual reports. Three of the banks have December year-ends (Standard Bank, ABSA and Nedbank), while FirstRand has a June year-end and Investec a March year-end. The six-month unaudited interim data for 31 December 2012 (under Basel II) and 31 December 2013 onwards (Basel III) was used for FirstRand. For Investec, the six-month interim figures as at September were used in the model. Net income, total assets and total equity figures and the Basel ratios were obtained from the banks' annual and interim reports.

### **3.4 Data Analysis**

Literature as well as banks' disclosure of their Basel III ratios (from their annual reports) was discussed towards the end of Section 2. A summary of South Africa's five largest banks' Basel III and profitability ratios has also been detailed. This forms the underlying basis for the analytical model generated. The data collected and captured is presented in the form of a base model that represents banks' profitability as at 31 December 2012 – the changeover point from Basel II to Basel III. The individual five banks information is summed together as a representation of the South African banking industry. Various pieces of literature demonstrate that bank profitability is measured by return on equity (Goddard, Molyneux and Wilson, 2004), return on assets or net interest margins (Flamini, McDonald & Schumacher, 2009).

The individual banks' 2012 annual report assessment of their expected Basel III impact is summarised in Section 4.1. The banks' expectation of the change in profitability from Basel II to Basel III is highlighted before analysing the generated model, as well as the

actual profitability figures in 2013 and 2014. Finally, market performance data is then analysed in support of the modelled profitability and actual profitability of the South African representative bank.

It is noted that it is now possible to analyse the actual profitability figures post Basel III implementation and scrutinise the impact of the changes. However, bank profitability is sensitive to a multitude of microeconomic and macroeconomic factors and hence it is difficult to isolate the specific effect of just the Basel changes. Therefore, the generated analytical model of the South African bank industry is used to measure the impact of the capital and liquidity changes in Basel III. The model uses a DuPont system of financial analysis with ROE and ROA as output figures and a measure of profitability. DuPont is a widespread financial analysis system. It decomposes ROE into components that determine profit efficiency, asset efficiency and leverage. The DuPont ratio is a common method used to compute ROE and is calculated in the following way:

$$ROE = \frac{\text{Net Income}}{\text{Operating Income}} \times \frac{\text{Operating Income}}{\text{Total Assets}} \times \frac{\text{Total Assets}}{\text{Total Equity}}$$

To meet the increased capital demands of Basel III, banks can issue new equity, cut costs and thereby boost retained earnings or reduce risk-weighted assets. Reducing assets is unlikely to be pursued by banks due to the loss of revenue and comparative advantage over other banks and financial intermediaries. It stands without reason that obtaining new equity can be costly (probably the most costly in achieving Basel III's increased capital requirements) and will negatively affect banks' profitability. Findings by Cosimano and Hakura (2011) suggest that under Basel III the large banks would on average need to increase their equity-to-asset ratio by 1.3 percentage points. If banks increase equity to meet the new Basel III capital ratios they will do so without interfering with their balance sheet assets and liabilities. They could in fact purchase new assets with the money raised from increasing equity.

Holding all else equal, the effect of an increase in capital on ROE (which will also increase the equity-to-asset ratio), is modelled using 2012 figures. This was the final year under Basel II in South Africa. The model allows for measuring what effect, for



example, a capital increase of 2% would have on the profitability of the South African banking sector. Section 2.3.1 highlights the strong capital position of the South African banking sector and illustrates how it has been operating well above the Basel III minimum requirements in 2013. Therefore, it is highly unlikely the South African banking sector would need to increase capital at all ahead of the initial Basel III changes in 2013 and would probably only require a minor increase in capital in order to meet the increasing requirements through to 2019. A relatively small increase of 2% in capital was therefore considered appropriate to model the impact of the capital change.

The model uses ROA and net interest margins (NIM) to measure the impact of the Basel III liquidity measures. ROA is a common bank profitability indicator and used to measure how profitable a bank is relative to its assets. In order to isolate the liquidity measures the following equation for ROA has been used:

$$ROA = \text{Net interest margin} + \text{Non – interest margin} + \text{Special income margin}$$

Assuming banks don't pass on the costs to customers, and all else held equal, the LCR is expected to decrease ROA as banks move to holding more high quality, low-yielding assets. As the Basel III liquidity measures are more complex than the capital measures and are applicable from 2015, it is difficult to assess exactly how the banking sector will initially react. This study therefore aims to measure the profitability impact using a range from a relatively small to relatively significant liquidity movement. Furthermore, the model produced allows for an easy input of different measurement drivers which measure profitability impact. Therefore, using the 2012 figures under Basel II, the non-interest margin and special income margin is held constant while a decrease of 10, 20 and 25 basis points in the NIM is modelled to measure the impact on profitability for the South African banking sector.

The NSFR addresses maturity mismatches between bank assets and liabilities (Bank for International Settlements, 2010a:25). This can be referred to as funding risk and to assess the ratios impact on profitability the model takes a more in depth look at NIM.

Whereas a NIM on total assets is used in the ROA and ROE calculations above, a NIM on interest-bearing assets is calculated in evaluating the NSFR impact. Interest-bearing assets are the loans and other securities banks earn income from and are therefore more relevant to this study. The following equation is used:

$$\text{Net Interest Margin} = \frac{\text{Net Interest Income}}{\text{Interest Bearing Assets}}$$

Busch and Memmel (2014:1) state that a bank's NIM is the cost of financial intermediation, which in turn can be split into maturity (or term) transformation, credit risk and liquidity and payment management. Maturity transformation entails granting loans that are long term in nature and accepting short-term deposits. This is exactly what the NSFR address by encouraging banks to hold more stable and longer term funding sources. Schmieder, et al. (2012:4) mentions that the Basel liquidity framework includes a component to assess risks arising from maturity transformation.

Only Standard Bank provides a detailed maturity analysis in their annual reports and thus it is the only bank used to quantify maturity transformation. Standard Bank is the largest bank in South Africa in terms of total assets, contributing approximately 30% of the total banking assets in South Africa, as at 31 December 2012 (SARB, 2012; Standard Bank 2012 annual report). Standard Bank has therefore been used as a proxy for the South African banking sector to measure the NSFR's effect on maturity transformation and ultimately profitability.

The maturity of the major classes of assets and the contractual financial liabilities is split into three buckets, namely less than one month, one month to twelve months and longer than twelve months. The average maturity of assets and liabilities is then respectively calculated. Next, the South African yield curve is used to calculate maturity transformation by plotting the average maturities of assets and liabilities. The yields were obtained using data from the Bond Exchange of South Africa (BESA) on the 27<sup>th</sup> January 2017. The difference in asset yield and liability yield is then determined to be maturity transformation. Once the maturity transformation is obtained, the difference to the NIM figure is the resultant liquidity and payment management and credit risk. Using

this breakdown of NIM credit risk and liquidity and payment management can be held constant, while reducing the maturity transformation (expected effect of NSFR) to assess the impact on the NIM, ROA and ROE. The cost of maturity transformation depends on the shape of the yield curve and will rise if the yield curve is steep. As the short end South Africa's yield curve is only moderately steep, the study quantifies the effect of a 10, 20 and 25 basis point decline in maturity transformation on NIM, ROA and ROE.

## **4 RESULTS**

### **4.1 Introduction**

The analysis commenced with a review of the five major South African banks' expectations of the Basel III changes, prior to its implementation. An analytical model of the South African banking industry, together with a DuPont system of financial analysis was then used to measure the effect of the capital and liquidity changes under Basel III. Thereafter, a review of the actual profitability of the South African banking industry post Basel III implementation (year end 2013 and 2014) was assessed and discussed. Finally, market performance data for the South African banking industry was reviewed and compared to the findings of the modelled profitability and actual profitability of the representative bank. This section discusses the results of each stage of the analysis set out above as well as emerging insights.

### **4.2 South African Banks' Expectation of the Basel III Effect**

Regulatory reform is a key factor in South African banks' strategic outlook and balance sheet positioning. This is largely due to the implementation of Basel III on 1 January 2013. There are a host of challenges and implications on a bank that arise with the implementation of Basel III.

A key theme that emerged upon review of the five major South African banks' 2012 annual reports with respect to Basel III was the challenge of implementing the new liquidity ratios (LCR and NSFR). LCR implementation is required from 2015 while NSFR is due for implementation in 2018. PWC's 2014 analysis of the South African major banks highlights that compliance with the LCR will significantly impact the bank's funding strategy in the short to medium term.

Standard Bank South Africa (SBSA) mentions in their 2012 Annual Report that the group are taking several steps to ensure compliance with the two liquidity metrics. They have increased liquid asset buffers and developed liability products to reduce net cash outflows in preparation to meet the LCR requirement. SBSA further asserts that they are promoting product development and initiatives to extend the group's funding base in order to comply with the NSFR.

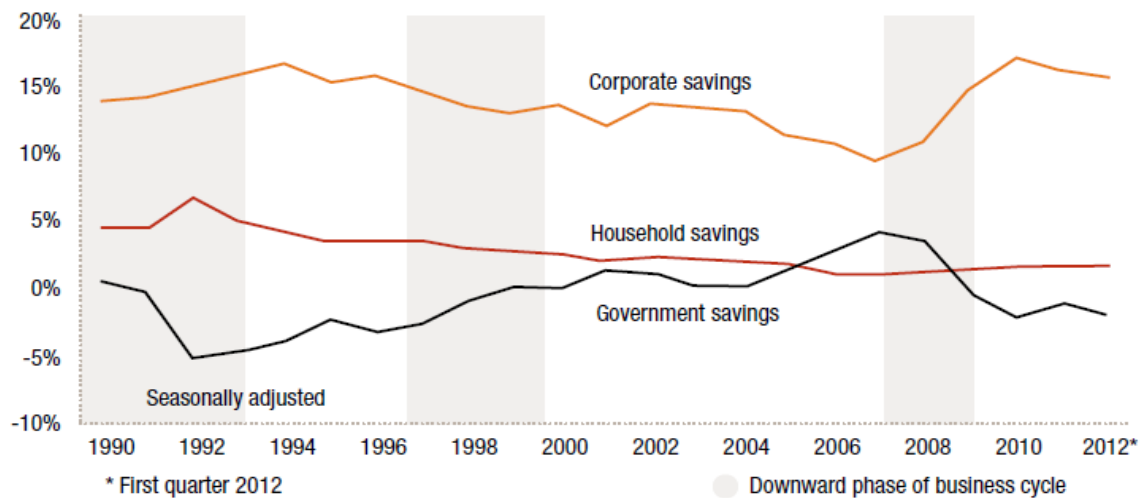
According to the ABSA Group Limited 2012 Risk Report, the group will maintain a strong liquidity position and will work with the SARB to ensure compliance with the Basel III liquidity framework. The group highlights that they have surplus liquid assets under a month survival horizon and they are reassessing their strategy in relation to liquidity buffers. They do however mention that the NSFR remains a challenge given the structural features of the South African economy and this will be a key focus area for them going forward.

Nedbank's 2012 Annual Report also identifies the two liquidity ratios as a "key challenge". They, however, believe that they are well positioned in respect of the LCR and, on a pro forma basis, are already compliant with the 2019 100% LCR requirement (assuming access to SARB's committed liquidity facility). Nedbank go further, mentioning a number of steps they have taken to help meet the LCR requirement. Some of the steps include purchasing surplus level 1 assets, increasing the quantum of long-term funding, investigating opportunities to structure new corporate lending in the form of corporate bonds versus traditional advances to increase the potential market capacity of level two assets and focusing on growing retail and commercial deposits. Much in the same manner as ABSA, Nedbank are more negative with respect to the NSFR and indicate that the structural challenges within the South African financial markets add to the challenge of compliance with this particular ratio.

FirstRand Bank stress in their 2012 Annual Report that they anticipate a "significant impact" when implementing the LCR and NSFR rules. They expect the SARBs liquidity facility to alleviate some of the structural constraints to LCR compliance. They also expect the LCR to influence the bank's funding strategy. Like FirstRand, Investec Bank appear very concerned in their 2012 annual report with respect to the new liquidity measures. They mention that the banking industry will find it difficult to meet the new liquidity ratios. They stress that a major focus area will be the need to reshape the nature of their deposit books towards more retail and longer-term funds, in order to meet the Basel III liquidity guidelines. They do not mention anything more specific regarding the impact of meeting the ratios but highlight the potential negative impact these ratios may have on the economy in general.

According to PWC (South African Banking Survey, 2013), two of the big four South African banks ranked the impact of the NSFR as the most significant impact of Basel III.

From the 2012 reports it appears PWC are referring to ABSA and Nedbank who mention that the structural features of the South African economy ensures compliance with the NSFR will be challenging. The PWC report depicts this feature of the South African economy, with a graph displayed below (Figure 4.1). Extremely low discretionary retail savings in South Africa (refer to Figure 4.1) forces banks to rely on institutional funding – a less stable form of funding under Basel III.



**Figure 4.1: Gross Savings as percentage of GDP. Source: SARB Annual Economic Report (2012).**

The NSFR requires banks to fund assets with longer-dated, more stable sources of funding. This will create challenges in many emerging market economies, not just South Africa. High maturity transformation is prevalent in the South African banking sector due to the short-term funding structure of the South African economy and the fact that banks have traditionally held long-dated assets, such as retail mortgages. It is therefore no surprise that the major South African banks view the NSFR as a significant challenge.

From a capital adequacy perspective, the banks will face obvious pressures as the Basel III capital requirements increase along the implementation timeline. The South African banks have high capital ratios that will work in their favour.

SBSA anticipate making adjustments to their business model in order to focus more on transactional banking, which is less capital-intensive and generates good annuity

income (2012 Annual Report). They plan to do this in order to manage the impact on profitability and ROE. Overall SBSA conclude that they expect a reduction in the group's capital adequacy ratios but will remain adequately capitalised in meeting the new Basel III requirements. The Group's 2012 Risk Report also states that they will be Basel III compliant with focus areas that include optimising capital and liquidity allocation between product lines, trading desks, industry sectors and legal entities that result in financial resources being allocated in a manner that enhances the overall group economic profit and return on equity (ROE).

In their 2012 Annual Report Nedbank reported that their capital ratio's had strengthened through 2012, rendering them well positioned to adopt Basel III. According to their 2012 Risk Report, their remaining Basel III capital-related work included, amongst other points, issuing new Tier II debt capital that complies with the Basel III loss absorbency requirements and phasing out hybrid capital instruments. Nedbank further stated in the Annual Report that an upward revision of capital that was allocated to the different business clusters resulted in a dilution of the clusters ROE performance, given higher capital levels. They concluded that those enhancements had no impact on the group's overall capital levels and ROE.

ABSA Group Limited disclosed a strong capital position and mention that they will remain adequately capitalised after the implementation of Basel III (Risk Report, 2012). According to the report, they aim to maintain a strong, high quality and optimal mix of capital. Without disclosing any possible or specific effect to their profitability or capital ratios, ABSA stressed a number of times that they will meet the minimum requirements after the implementation of Basel III.

FirstRand Bank does not expect a significant impact on their core Tier 1 ratio according to their 2012 Annual Report. They do expect a more pronounced negative effect on their total capital adequacy ratio (due to non-cumulative, non-redeemable preference share capital and subordinated debt instruments that do not meet the new loss absorbency criteria). Furthermore, FirstRand highlights a leverage ratio well in excess of the SARB's minimum Tier 1 ratio of 4% and therefore believe this will provide no constraints to the bank.

According to Investec Bank Limited's 2012 Annual Report, they expect no problems in meeting the new Basel III requirements in time. They do expect a negative impact on

overall margins in the short to medium term. Investec, as with the liquidity ratios, do not mention any specific impact on their overall profitability with respect to the change in capital ratios. They reiterate that Basel III will have a strategic impact that will change the business models of banks worldwide, resulting in additional costs.

Despite the increase in the minimum regulatory capital requirement under Basel III, the major South African banks more or less indicate that they will continue to hold additional capital buffers. They do not expect a significant impact to profitability as they are planning to manage the impact of the new requirements through balance sheet management processes.

### 4.3 Results of Basel III Capital Change

Table 4.1 below presents the results of an increase in capital using figures for the South African banking industry for the last year under Basel II (2012). Basel III changes require an increased holding of high quality capital. Holding all else equal, the analytical model therefore increases capital by an estimated 2% in order to assess what the impact on profitability will be.

	<b>Basel II 2012</b>	<b>2% capital projection</b>
Profit	37 532	37 532
Assets	3 387 591	3 387 591
Total Equity	250 539	255 550
Total Liabilities	3 137 052	3 132 041
Net Profit Margin	13.45%	13.45%
Asset Turnover	0.08	0.08
ROA	1.11%	1.11%
Gearing (Total Assets / Equity)	13.52	13.28
ROE	14.98%	14.69%
Change from 2012 actual		-0.29%

**Table 4.1: Increased capital change results**



The results show that a 2% increase in equity (achieved by increasing the equity-to-asset ratio and holding all else equal) results in a 0.29% decrease in ROE.

#### 4.4 Results of Basel III New Liquidity Ratios

In order to manipulate the effect of the Basel III liquidity ratios on profitability, a NIM on interest earning assets was first calculated. The South African banking industry earned a net yield of 3.26% on interest earning assets for the year ended 2012 under Basel II, as calculated in Table 4.2 below.

Net Interest Income	83 716
Interest Earning Assets	2 569 789
Net Interest Margin	3.26%

**Table 4.2: NIM on interest earning assets**

Second, the average maturity of assets and liabilities was calculated in order to determine the maturity transformation component of the NIM on interest earning assets. The average maturity of the South African banking sector (using Standard Bank as a proxy) liabilities was “less than 1 month”, as at 31 December 2012. Using the South African yield curve, the one-month rate was 7.1348. The average maturity of assets was “longer than 12 months”. Through analysing Standard Bank Group’s 2012 Risk Report, an asset maturity of three years was deemed to be a feasible estimate. The yield on a three-year instrument was 7.9865.

A maturity transformation of 0.8517 ( $7.9865 - 7.1348$ ) was therefore calculated for 2012. This implied liquidity and payment plus a credit risk figure of 2.4083 (being the difference between the NIM and maturity transformation).

Table 4.3 below presents the results on NIM for a 10, 20 and 25 basis point decrease in maturity transformation. The results breakdown the NIM into maturity transformation and liquidity management, as well as credit risk, and display the 0.1%, 0.2% and 0.25% decrease in NIM due to the corresponding decrease in maturity transformation.

			2012	-0.1	-0.2	-0.25
Avg. Maturity of Assets	3 year yield	7.9865				
Avg. Maturity of Liabilities	1 month yield	7.1348				
Maturity Transformation		0.8517		0.7517	0.6517	0.6017
Liquidity Mgmt. & Credit Risk		2.4083		2.4083	2.4083	2.4083
NIM		3.26		3.16	3.06	3.01

**Table 4.3: NIM effect due to a decrease in maturity transformation**

The effect on ROA and ROE after applying a 0.1%, 0.2% and 0.25% decrease to NIM, holding all else equal, was then calculated. Firstly the impact on ROA was measured using the formula of  $ROA = NIM + \text{non-interest margin} + \text{special income margin}$  (holding non-interest margin and special income margin constant). Thereafter, the impact on ROE was measured using the DuPont formula where  $ROE = ROA \times \text{gearing}$  (gearing held constant).

	2012	-0.1	-0.2	-0.25
Net Interest Margin	2.47%	2.37%	2.27%	2.22%
Non-Interest Margin	-0.28%	-0.28%	-0.28%	-0.28%
Special Income Margin	-1.08%	-1.08%	-1.08%	-1.08%
ROA	1.11%	1.01%	0.91%	0.86%
Gearing (Total Assets / Equity)	13.52	13.52	13.52	13.52
ROE	14.98%	13.63%	12.28%	11.60%

**Table 4.4: ROA and ROE effect due to a decrease in maturity transformation**

Table 4.4 above illustrates the fairly significant impact on profitability of just a 0.1, 0.2 and 0.25 percentage point decline in maturity transformation and therefore NIM. A

decrease of 0.1% in NIM results in a 1.35% decrease in ROE (falling from 14.98% to 13.63%). A decrease in NIM of 0.2% and 0.25% resulted in a 2.7% and 3.38% decrease in ROE respectively.

#### 4.5 Actual Profitability of the South African Banking Sector

South Africa has a sound and sophisticated banking system. South African banks tend to hold strong capital buffers and this is evidenced in Table 4.5 below. The results of the analytical model postulates that the South African banking sector is more than adequately capitalised above the regulatory requirements, post the Basel III implementation date.

		<b>Basel II 2012</b>	<b>Basel III 2013</b>	<b>Basel III 2014</b>
Total book assets		3 387 591	3 577 996	3 880 697
Risk weighted assets (RWA)		1 773 711	1 868 157	2 013 039
RWA / total assets (%)		52.36%	52.21%	51.87%
Total qualifying capital and reserves		277 647	291 809	302 299
CET 1 Ratio			11.8%	11.6%
Tier 1 Ratio		12.4%	12.5%	12.2%
Total Ratio		15.7%	15.6%	15.0%
Regulatory minimum total capital ratio		9.5%	9.5%	10.0%

**Table 4.5: Basel capital ratios 2012-2014**

The South African representative bank achieved a total capital adequacy ratio of 15.6% in 2013 (after the implementation of Basel III) and 15% in 2014. The CET1 ratio was 11.8% in 2013 and remained steady at 11.6% in 2014. RWA assets increased steadily from 2012 through to 2014; however, RWA as a percentage of total assets decreased from 52.36% (2012) to 52.21% (2013) and 51.87% in 2014.

Using ROE and ROA as the key profitability measures, the South African banking sector actually looks healthier post Basel III implementation. The analytical model with the DuPont analysis does, however, show that ROE did decrease from 2012 (Basel II) to 2013 (Basel III), thereafter increasing fairly significantly in 2014. ROA too increased from 2012 through to 2014 (refer to Table 4.6 below). Furthermore, the NIM (on total assets) also increased from 2.47% (2012) to 2.66% (2013), and to 2.84% in 2014.

	<b>Basel II 2012</b>	<b>Basel III 2013</b>	<b>Basel III 2014</b>
Net Profit Margin	13.45%	13.73%	13.92%
Asset Turnover	0.08	0.08	0.08
ROA	1.11%	1.11%	1.14%
Gearing (Total Assets / Equity)	13.52	13.20	13.38
ROE	14.98%	14.60%	15.23%
Net Interest Margin	2.47%	2.66%	2.84%
Non-Interest Margin	-0.28%	-0.47%	-0.68%
Special Income Margin	-1.08%	-1.09%	-1.01%
ROA	1.11%	1.11%	1.14%

**Table 4.6: South African banking sector profitability 2012-2014**

The South African banking sectors exposure to liquid or short-term assets has remained largely stable post the introduction of Basel III. Summing cash, government securities and other short-term securities off the balance sheet, the liquid asset exposure has decreased from 7.96% in 2012 to 7.75% in 2013 and finally down to 7.61% in 2014. Table 4.7 below provides the breakdown.

	<b>2012</b>	<b>2013</b>	<b>2014</b>
Total Assets	3 387 591	3 577 996	3 880 697
Cash Assets (cash/gov/short-term)	269 659	277 208	295 217
Non-Cash Assets	3 117 932	3 300 788	3 585 480
Liquid Asset %	7.96%	7.75%	7.61%

**Table 4.7: South African banking sectors exposure to short-term assets**

On the liabilities side of the balance sheet, short-term funding or deposits as a percentage of liabilities and equity has remained stable and slightly increased after the implementation of Basel III. The South African banking sector's exposure to deposits as a percentage of liabilities and equity increased from 75.02% in 2012 to 76.44% in 2014. Table 4.8 below presents the breakdown.

	<b>2012</b>	<b>2013</b>	<b>2014</b>
Amounts owed to depositors	2 541 373	2 712 158	2 966 268
Total equity and liabilities	3 387 591	3 577 996	3 880 697
% Deposits	75.02%	75.80%	76.44%

**Table 4.8: South African banking sector's exposure to short-term funding**

On the assets side, the maturity breakdown (using Standard Bank as a proxy) has also remained fairly stable post the Basel III implementation. Table 4.8 below illustrates the assets broken down into three maturity buckets, namely 'less than 1 month', '1 to 12 months' and 'greater than 12 months'.

<b>Assets</b>	<b>&lt; 1 month</b>	<b>1 - 12 months</b>	<b>&gt; 12 months</b>
2012 (Basel II)	19.55%	14.65%	65.80%
2013 (Basel III)	19.30%	13.43%	67.83%
2014 (Basel III)	19.63%	14.25%	66.12%

**Table 4.9: Assets maturity analysis**

As Table 4.9 shows, 65.80% of assets had a greater maturity than 12 months under Basel II in 2012 and this increased to 67.83% in 2013 before falling slightly to 66.12% in 2014. No significant movements in assets with a maturity of less than one month occurred after the Basel III adoption.

The liabilities maturity breakdown on the other hand experienced more notable fluctuations in comparison to assets for the same period under review. Table 4.10 shows that liabilities with a one-month maturity increased from 60.43% in 2012 to 67.45% in 2014. Furthermore, liabilities with maturity greater than 12 months decreased from 19.21% in 2012 to 17.16% in 2014.

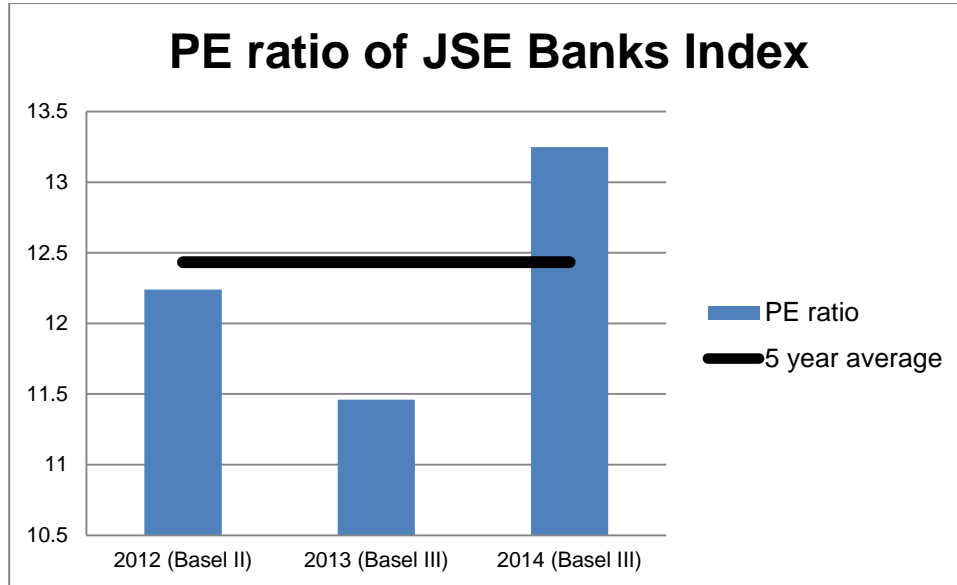
<b>Liabilities</b>	<b>&lt; 1 month</b>	<b>1 - 12 months</b>	<b>&gt; 12 months</b>
2012 (Basel II)	60.43%	20.37%	19.21%
2013 (Basel III)	66.48%	17.38%	16.14%
2014 (Basel III)	67.45%	15.38%	17.16%

**Table 4.10: Liabilities maturity analysis**

## 4.6 Market Performance of the South African Banking Sector

The market performance of the South African Banks Index displays a drop in 2013 in and then a significant jump in 2014, as can be seen by Figure 4.2 below. The PE ratio of the Banking Index highlights a fall in bank valuations from around roughly the five-

year average (2010-2014) in 2012 under Basel II to 2013 under Basel III. Thereafter, a significant increase occurred in the PE ratio to 2014.



**Figure 4.2: PE ratio of the South African banking industry (2012-2014). Source: Bloomberg (JSE Banks Index).**

## 4.6 Discussion of Results

### 4.6.1 Capital changes under Basel III

The results from measuring the capital change on the profitability of the South African banking sector are consistent with the McKinsey (2010) study on European and American banks. One difference it that the McKinsey study measures the ROE impact at full Basel implementation in 2019, while this study focuses on the immediate impact post 1 January 2013 implementation. Considering South African banks are well capitalised, it is unlikely that the South African banking sector will be required to significantly increase equity in order to meet the Basel III enhanced capital requirements. It thus seems probable that even a 2% increase in equity (as was modelled in this study) will possibly not be immediately required by the banking sector.

An in-depth analysis of RWA did not form part of this study but as can be seen from Table 6.1 (see Appendix), RWA has trended upwards from 2012 through to 2014. This

implies that while RWA continue to rise South African banks will have to establish methods to increase capital in order to meet the increasing Basel capital ratio requirements. This will have to be either through earnings, a cut in dividends or new equity. As can be seen from Table 6.1, a 2% increase in equity (by increasing the equity-to-asset ratio and all else held equal) will decrease ROE by 0.29%. The South African banking sector will need to find ways to mitigate this negative profitability impact should they be required to increase equity at some point during the full 2019 phase in period.

The actual profitability results of the model South African bank created, more or less fell in line with the five individual banks' expectations of the Basel III capital change impact. The five banks indicated in 2012 that they will continue to hold additional capital buffers and did not expect a significant impact from the capital changes under Basel III. The capital ratios of the modelled South African bank in 2013 and 2014 remained strong exactly as the individual banks said they would in 2012. The capital adequacy ratios reflected a strong capital buffer and indicated that good capital management procedures have been implemented by the sector in the recent past. The results are promising, indicating that the South African banking sector is currently compliant and also ready to be fully compliant with the final Basel III capital rules by 2019. It is also important to note that the CET1 ratio has remained resilient well above the regulatory minimum requirement. The total capital adequacy ratio has decreased from 15.6% in 2013 to 15% in 2014 and the 2015 and 2016 results would need to be evaluated to establish if a declining trend emerges. The 7.76% increase in RWA from 2013 to 2014 is likely a major contributor to the decline in the capital adequacy ratio. Despite this, there is little evidence to suggest the South African banking sector will struggle to meet the increased capital requirements under Basel III over the forthcoming years.

With respect to profitability it is difficult to isolate the Basel III impact in the numbers considering the numerous factors that affect a bank's ROE and ROA. Banks are also easily able to pass on the cost of having to hold increased capital to borrowers. Assessing lending rates is not part of this study, however this is an example of the difficulty in drawing conclusions of the pure Basel III effect on actual profitability figures post 1 January 2013.

The South African representative bank illustrated that ROA remained constant in 2013 after the Basel III implementation and then increased marginally from 1.11% to 1.14%



in 2014. ROE experienced a relatively small decline in 2013, which corroborates the empirical analysis performed on the capital and liquidity changes under Basel III. Effectively, the ROE of the South African banking industry decreased under the first year of the Basel III adoption.

2014 and the second year under Basel III illustrates a significant increase in ROE for the representative bank. ROE moved from 14.98% in 2012, to 14.60% in 2013 and then jumps to 15.23% in 2014. Furthermore the NIM also improved after the implementation of Basel III.

The increase in ROE in 2014 (the second year under Basel III) for the South African bank, does not necessarily contradict the results of this study (see Section 4.2) or the McKinsey study referenced by the BCBS. Bank performance is sensitive to macroeconomic factors such as monetary policy, just as an example. Rising interest rates improve banks' interest income and therefore profit margins. The SARB increased interest rates by 75 basis points during 2014. This is evidenced by the fairly significant increase in net profit margin in 2014 (see Table 4.6). This is consistent with a study by Borio, Gambacorta and Hofmann (2015) on 109 banks in 14 economies that found a positive relationship between short-term interest rates and bank profitability. The increase in interest rates in 2014 therefore accounts for a large portion of the rise in profitability for the South African banking sector.

#### ***4.6.2 Liquidity changes under Basel III***

The results from measuring the impact of the Basel III liquidity ratios suggest a significant profitability impact for the South African banking sector. NIM, ROA and ROE will all be negatively affected by the introduction of the LCR and NSFR. This falls in line with the individual bank's expectations summarised in Section 4.1, where all five major South African banks unequivocally stressed the challenges in meeting the LCR and NSFR.

This study assessed the impact of the LCR and NSFR collectively as a relationship between the two ratios was evident. The LCR requires banks to hold enough HQLA to survive a one-month stress period. Increasing liquid assets also increases the numerator of the NSFR and therefore assists in meeting the requirement in addition to

the LCR. Banks ultimately face a trade-off between mitigating liquidity risk and the opportunity cost of holding liquid assets.

With respect to liquidity, banks aim to find a balance between this and profitability. The Basel III liquidity ratios force banks to hold an increased level of high quality assets but their generally lower returns present profitability challenges. The results in this study of decreasing maturity transformation while holding all else equal, indicates that South Africa is not immune to these challenges.

The results are consistent with the findings of King (2013), Molyneux and Thornton (1992) and Goddard, Molyneux and Wilson (2004), to name a few. King (2013) finds that strategies adopted to meet the NSFR will reduce banks' NIM fairly significantly. Molyneux and Thornton (1992) found a significant inverse relationship between liquidity and profitability. Similarly, Goddard, Molyneux and Wilson (2004) found a negative relationship between liquidity and profitability in a study on European banks.

The decrease in NIM's from the Basel III liquidity requirements is fully expected as HQLA are typically low interest yielding. However, relatively small declines in maturity transformation and thus NIM will translate into significant declines in ROE as illustrated in Table 4.4. A decline in maturity transformation of 10 basis points caused a 1.35% decrease in ROE; a 20 basis point decline resulted in a 2.7% decrease; and a 25 basis point decline resulted in a 3.38% decrease in ROE. This translates into a significant inverse relationship between the Basel III liquidity measures and profitability for the South African banking sector.

The assessment of the liquid assets percentage for the South African banking sector, displayed in Table 4.7, possibly presents a contradiction. Liquid assets as a percentage of total assets have in fact decreased from 7.96% in 2012 to 7.75% in 2013 and to 7.61% in 2014. This suggests that there has not been a push from the sector to increase HQLA. It is important to note that HQLA contains certain covered bonds that have not been included in this calculation. The liquid assets percentage simply includes cash, government securities and other short-term securities. Despite the bonds exclusion, the results of the analytical model suggest there has been no push to increase HQLA in the years leading up to the LCR requirement in 2015. Most of the five major banks did indicate they were well placed to meet the mandatory 2015 LCR requirement of 60%. This could imply one or a combination of the following:

- The South African banking sector already had enough HQLA to be compliant with the LCR in the years preceding the 2015 requirement; or
- A late push into further HQLA in the 2015 financial year occurred; or
- South African banks are making use of the CLF provided by the SARB; or
- Banks have been adjusting their in-and outflows to ensure compliance with the LCR.

Cash inflow and outflow information necessary to calculate the LCR was not available in banks' annual reports for the 2012 to 2014 period under review. The effect of net flows on the LCR has therefore not been assessed in this study.

South Africa's capital market has limited availability of government debt securities and this is the reason why the BCBS made provisions for CLFs (which was adopted by the SARB). The availability of HQLA is expected to be a concern for South African banks and this is arguably the reason for the stable liquid assets percentage between 2012 and 2014 presented in Table 4.7. These results thus do not come as a total surprise despite the onset of the LCR in 2015. South African banks can make use of the CLF in order to meet the LCR requirement. Extensive research into the use of CLFs does not form part of this study.

The maturity analysis (using Standard Bank as a proxy) of assets also supports the above finding that there was no movement towards holding more HQLA as at 31 December 2014. Table 4.9 illustrates that the percentage assets with a maturity of less than one month had barely increased from 2012 to 2014.

While there has been no real movement in HQLA between 2012 and 2014, the results in Table 4.8 indicate that some movement in meeting the Basel III liquidity measures has taken place on the liabilities side of the balance sheet. The exposure to deposits as a percentage of liabilities and equity increased from 75.02% in 2012 under Basel II to 76.44% in 2014 under Basel III. Due to the difficulty in obtaining the information, unfortunately this study has not unpacked deposits in order to establish the breakdown between more stable customer deposits and less stable wholesale funding. However, as stated earlier and depicted in Figure 4.1 the South African banking sector mostly relies on wholesale funding. The BCBS reiterates this by stating that South African

banks are largely funded by domestic deposits with 25% retail and 75% wholesale deposits (Bank for International Settlements, 2015:7). If the increase in percentage of deposits between 2012 and 2014 has simply occurred due to an increase in short-term wholesale funding then the South African banking sector has not made much progress towards NSFR compliance.

The aforementioned statement is supported by the liabilities maturity analysis illustrated in Table 4.10. The percentage of liabilities with a maturity of less than one month was 60.43% in 2012 and increased to 67.45% in 2014. This is a fairly significant increase within the space of three years and together with the fairly stable asset maturity over the same period (Table 4.9), indicates that there has been no push to reduce maturity transformation thus far. Implementation of the NSFR only commences in January 2018; however, leaving the banks with some time to effect changes and meet the new liquidity ratio.

Overall, Table 4.10 suggests that debt maturity did in fact reduce between 2012 and 2014, with the NSFR still a few years away. A reduction in debt maturity implies lower interest expense and therefore a higher NIM. This further supports the higher profitability achieved by the South African banking sector in 2014, illustrated in Table 4.6.

#### ***4.6.3 Market performance data***

To support the findings of this study, market performance data of the JSE Banking Index indicates a similar story to the modelled profitability and representative bank's actual profitability for the period 2012 to 2014. In 2012 and the last year under Basel II, the Banking Index PE ratio was roughly around the five year average. In 2013 and the first year under Basel III, a clear structural break occurs as the PE ratio fell from 12.24 (just less than the five year average) to 11.46. The PE ratio gauges the market's assessment of the firm's future (Leibowitz & Kogelman, 1990:2). Beaver and Morse (1978) have shown that the PE ratio can predict future earnings changes. The fall in the JSE Banking Index PE ratio in 2013 thus indicated a decline in earnings prospects or more risk to profits for the South African banking industry in 2013. This is not surprising as throughout this study it has been discussed how the new Basel III measures on capital and liquidity adopted in 2013 should raise the costs for banks from a pure accounting

perspective. The banking industry themselves have the same expectation. This indicates an opportunity cost for banks, which negatively affects the profitability and shareholder value of a bank (Bordeleau & Graham, 2010).

The fall in the Banking Index's PE ratio over the Basel changeover period (2012 to 2013) validates both the modelled profitability due to the capital and liquidity changes (sections 4.2 and 4.3) and the actual profitability of the representative bank (Section 4.4). The modelled profitability highlighted a decline in profitability due to the new capital and liquidity measures under Basel III. Following this notion, the actual profitability of the representative bank fell from 14.98% in 2012 to 14.6% in 2013 and the first year under Basel III (Table 4.6). Therefore, the fall in JSE Banking Index PE ratio in 2013 after the initial implementation of Basel III agrees with the arguments presented in this study.

Following the decline from 2012 to 2013 in the PE ratio of the JSE Banking Index (see Figure 4.2), the ratio significantly increased the following year in 2014. On face value this turnaround early during the Basel III phase in period goes against the expectations of increased costs and reduced profitability under the new measures. However, the Banking Index market data for 2014 falls in the line with the actual profitability of the South African representative bank, which also indicated a significant increase in profitability (see Table 4.6) in 2014. The increase in profitability for 2014 can be explained by the SARB's increasing of interest rates during the period and therefore a huge jump in profit margins for banks. The increase in interest rates would have increased banks' earnings growth rate that subsequently results in a higher PE ratio, which is exactly what the JSE Banking Index experienced in 2014. The market performance data for the JSE Banking Index therefore corroborates the findings of this study for the periods under review.

#### ***4.6.4 Summary and implications***

Various strategies, some of them mentioned in this study, are available to banks in order to meet the Basel III enhanced capital ratios. The choice of strategy will more than likely be dependent on existing capital ratios. This study has reinforced the healthy capital

position of the South African banking sector and it is for this reason that no significant adjustments are required to meet the Basel III capital adequacy ratio. Therefore, despite the negative profitability impact of the new capital measure uncovered through this study, the South African banking sector is unlikely to be affected in the near term. The sector can safely plan ahead towards the full 2019 implementation requirements and their current high capital ratios provide them with sufficient flexibility in meeting those requirements.

From a liquidity regulation standpoint, the general consensus from the industry is that South African banks will particularly struggle to meet the NSFR. The sector's asset duration is considerably higher than liability duration as evidenced in this study. The Basel III liquidity measures require banks to reduce maturity transformation, thereby moving away from the current trend where long-term assets are funded by short-term liabilities. Due to this requirement of longer term funding and the overall negative profitability impacts demonstrated in this study, it is not unreasonable to expect banks to increase lending rates. Both the LCR and the NSFR will impact the cost of bank funding. A higher holding of HQLA, that is typically lower yielding, will place downward pressure on bank's margins.

Although this paper makes no attempt to quantify the effect on lending rates, the reality is that South African banks can pass on the costs of tighter regulation to consumers. Alternatively, banks will have to strategically reduce indirect lending costs by, for example, streamlining their lending process or enhancing automation. The more likely scenario, however, is for banks to increase lending rates. This is a widely anticipated response to the Basel III measures and therefore the vast majority of the Basel III studies have assessed impact on lending rates. In aggregate, the empirical evidence reported in the literature on Basel III and lending strongly suggests that an increase in capital and liquidity requirements will definitely increase lending rates or reduce lending in the long run. While most of the studies have been performed on the European market, it is not unreasonable to expect South African banks to follow suit given the negative profitability impact of Basel III demonstrated in this study.

If the South African banking industry passes on the costs of meeting the Basel III liquidity measures (and the capital measures should they be required to increase capital) to consumers through increasing lending rates, of great concern will be the negative

impact on the South African economy due to higher interest rates and possibly reduced lending by banks. Higher interest rates as banks cover increased funding costs can depress economic activity and ultimately filter through to lower GDP growth (Slovik & Cournède, 2011).

## **5 CONCLUSION, LIMITATIONS OF THE STUDY AND OPPORTUNITIES FOR FURTHER STUDIES**

### **5.1 Conclusion**

Empirical studies on the impact of Basel III are limited, having only recently gained momentum. The purpose of this study was to determine the profitability impact on the South African banking sector as a result of the change from Basel II to Basel III. There have been many changes in the new Basel Accord, however this study focused on the increased capital required and the new liquidity measures.

The strategic questions around Basel III are extensive, rendering an integrated view of its necessary impact. The various impacts on banks' profitability, business models and future actions make measuring the Basel III effect difficult. The difficulty is compounded by the vast possible behavioural responses from banks to the new regulation. All the research conducted on the Basel III impact thus far concentrates on one specific area in order to draw conclusions. In so doing, this study solely examined the effect on profitability and isolated the impact by holding bank behaviour constant. The study goes further to present a methodology for mapping higher capital and liquidity requirements on banks' profitability. This provides researchers with a useful tool to study the impact of regulatory changes on the profitability of the South African banking sector.

By employing an approach used by the BIS (King, 2010) that involved creating a representative bank and using accounting relationships, the results of this study indicate an inverse relationship between Basel III (or tighter capital and liquidity regulation) and profitability for the South African banking sector. The results of the Basel III capital change is in line with the BCBS ROE expectation in reference to a McKinsey study performed in 2010. The new Basel III liquidity measures yielded a more significant negative effect on profitability than the capital changes. This is consistent with the findings of King (2013) who finds that strategies adopted to meet the NSFR will reduce banks' NIM fairly significantly; and Molyneux and Thornton (1992) who found a significant inverse relationship between liquidity and profitability.

Despite the benefits, higher capital requirements and liquidity buffers result in additional costs. While the intention of the BCBS is clear, the literature around the effect of tighter capital and liquidity regulation is conflicting. Furthermore, the literature around the Basel



Accords and profitability is also unclear. Banks' reactive measures to the tighter regulation can take on many forms, making measuring the effect complex. From a pure accounting perspective, the Basel III capital and liquidity measures are expected to negatively affect profitability in the short-term. The results of this study support this notion. This study confirms that Basel III will reduce profitability for the South African banking sector and the extent will depend on how much the sector needs to adjust to meet the various ratios. It is for this reason that over the recent past many South African banks mentioned in their annual and risk reports that they seek to manage the effect of Basel III by balance sheet restructuring and business model adjustments.

The study effectively uses triangulation to strengthen the validity of the findings and create a deeper understanding of the Basel III changes. The model output is compared to three different sources of information (market data, actual profitability, and the relevant banks' expectations summarised in their annual reports), thereby reducing inherent bias. Market data obtained for the period 2012 to 2014 supports the findings of the generated model and this study. The fall in the PE ratio of the JSE Banking Index during the changeover period from Basel II to Basel III corroborates the findings of the modelled profitability due to the Basel changes, the actual profitability of the representative bank, as well as the major South African banks' expectations of the Basel III impact.

In conclusion, this study strongly suggests that, despite the benefits of banking regulation, the Basel III measures in isolation, and specifically the liquidity ratios, will reduce profitability for the South African banking sector. Promising, however, is that the study confirms the South African banking sector remains well capitalised and thus well placed to meet the full 2019 capital requirements with minimal impact on expected profitability. Depending on the extent to which South African banks' need to increase HQLA and reduce maturity transformation in order to meet the full LCR and NSFR, the profitability impact of these measures will be significant. One option available to the sector in adapting to meet these liquidity requirements to protect themselves against the significant negative profitability impacts, which is highlighted in this study, is to increase lending rates. As many previous Basel III studies on the impact of lending rates have concluded, this could lead to adverse side effects for the South African economy as a whole.

## **5.2 Limitations of the Study**

One of the banks used in this study, namely Investec Bank, does not have a December year-end and, therefore, September interim figures were used as a proxy for the South African representative bank. With respect to the evaluation of the impact of the NSFR on profitability, only one of the five South African banks used in this study had the necessary information publicly available. Standard Bank, the largest of the five banks in terms of total assets, was used as a proxy in the study. Moreover, most of the literature in existence and referenced in this study focuses on the United States and Europe. The severe lack of research conducted on the Basel Accords within an emerging market or specifically a South African context presented a challenge and further validated the need for this study.

## **5.3 Opportunities for Further Studies**

There are certain aspects of Basel III that were not in the research scope of this study. The leverage ratio and the countercyclical capital buffers within a South African context, as examples require research. Further studies on the use of the committed liquidity facility for certain jurisdictions like South Africa in meeting the Basel III liquidity measures also warrant investigation. The study focused on the five large banks in South Africa who make up more than 90% of total banking assets. It is worth further investigating the profitability effect on smaller South African banks that may not be as well capitalised and prepared to meet the Basel III deadlines.

Bank capital may also affect banks' ability to create liquidity and a strand of literature exists which assesses the link between bank capital and liquidity. This implies that compliance with the Basel capital ratios can affect compliance with the liquidity ratios and vice versa. Further research on the impact and link between the two sets of ratios is required.

As the global financial crisis highlighted, the stability of the banking sector is fundamental to the well-being of the entire global economy. Insightful knowledge of how regulation affects the system is therefore important and requires empirical research. Unfortunately, not enough studies on the impact of the Basel Accords have been

performed. The majority of the Basel analysis has been conducted by the BIS themselves.

## 6 APPENDIX

	<b>Basel II 2012</b>	<b>Basel III 2013</b>	<b>Basel III 2014</b>
Total book assets	3 387 591	3 577 996	3 880 697
Risk weighted assets (RWA)	1 773 711	1 868 157	2 013 039
RWA / total assets	52.36%	52.21%	51.87%

**Table 6.1: South African banking sector RWA 2012-2014**

This table is an extract from the representative bank model illustrating the RWA for the period 2012 through to 2014.

SA Model Bank Profit and Loss account (R million)			
	Basel II 2012	Basel III 2013	Basel III 2014
Interest received	193 665	201 709	228 667
Interest paid	(109 949)	(106 381)	(118 573)
Net interest income	83 716	95 328	110 094
Impairment charges on loans and advances	(24 642)	(24 065)	(22 384)
Income from lending activities	59 074	71 263	87 710
Non-interest revenue	85 335	86 641	88 691
Operating Income	144 409	157 904	176 401
Total expenses	(94 862)	(103 284)	(115 262)
Operating expenses	(92 876)	(101 639)	(113 085)
Credit impairment charges	(344)	1	(418)
Revenue sharing arrangements with group companies	(1 642)	(1 646)	(1 759)

Indirect taxation	(2 537)	(3 061)	(3 479)
Profit from operations before non-trading and capital items	47 010	51 559	57 660
Non-trading and capital items	(48)	(59)	(96)
Revaluation of investment properties	(1)	4	0
Profit from operations	46 961	51 504	57 564
Share of profits of associate companies and joint arrangements	334	190	635
Total direct taxation	(9 763)	(12 094)	(14 033)
Profit for the year	37 532	39 600	44 166
Other comprehensive income net of taxation	1 856	206	148
Exchange differences on translating foreign operations	490	1 355	294
Fair-value adjustments on available-for-sale assets	1 563	(1 046)	151
Re-measurements on long-term employee benefit assets	(201)	454	(247)
Gains on property revaluations	39	218	163
Net change in fair value on cash flow hedges	297	(262)	53
Realised fair value adjustments on cash flow hedges transferred to P&L	(332)	(513)	(266)
Taxation on other comprehensive income	(101)	96	0
Total comprehensive income for the year	39 287	39 902	44 314

**Table 6.2: South African representative bank profit and loss 2012-2014**

SA Model Bank Balance Sheet (R million)			
	Basel II	Basel III	Basel III
	2012	2013	2014
Assets			
Cash and cash equivalents	107 706	117 059	113 484
Other short-term securities	37 575	35 004	56 322
Derivative financial instruments	162 154	129 109	110 573
Government and other securities	124 378	125 145	125 411
Loans and advances	2 398 214	2 597 002	2 834 320
Trading assets	118 646	114 928	142 925
Hedging assets	5 439	3 344	2 335
Pledged assets	5 706	4 394	5 281
Other assets	33 969	26 190	22 997
Non-sovereign and non-bank cash placements	9 859	7 722	10 403
Reverse repurchase agreements and cash collateral on securities borrowed	8 970	6 067	6 764
Bank debt securities	24 095	22 247	22 585
Other debt securities	6 099	10 673	11 836
Own originated loans and advances to customers securitised	2 337	2 347	3 055
Other securitised assets	1 071	1 629	804
Accounts receivable	3 398	3 631	3 839
Commodities	8 003	6 894	6 271
Current taxation receivable	967	1 112	1 431
Investment securities	171 575	183 282	212 382
Non-current assets held for sale	2 654	1 869	997
Amounts due by holding company and subsidiary	21 539	24 270	26 975
Investments in associate companies & JV	66 292	82 755	78 448
Deferred taxation asset	308	163	324

Investment property	416	328	337
Property and equipment	32 762	35 230	38 263
Long-term employee benefit assets	5 280	2 847	4 409
Mandatory reserve deposits with central banks	12 641	13 199	14 843
Goodwill and Intangible assets	15 538	19 556	23 083
Total assets	3 387 591	3 577 996	3 880 697
Liabilities			
Derivative financial instruments	167 993	142 485	136 695
Amounts owed to depositors	2 541 373	2 712 158	2 966 268
Trading liabilities	73 510	76 677	69 479
Other liabilities	44 103	39 476	40 684
Repurchase agreements and cash collateral on securities lent	18 954	15 581	12 511
Liabilities on securitisation of loans and advances	2 934	2 659	970
Liabilities on securitisation of other assets	492	572	154
Current taxation liabilities	4 210	4 666	4 519
Creditors and accruals	6 532	7 820	9 187
Other liabilities held for sale	213	175	0
Deferred taxation liabilities	2 865	2 044	1 586
Provisions	1 616	1 640	2 245
Debt securities in issue	107 672	102 258	110 416
Borrowed Funds	17 907	15 762	10 535
Subordinated debt / Tier II Debt	41 353	38 844	41 247
Long-term employee benefit liabilities	9 285	7 335	9 509
Long-term debt instruments	30 295	33 265	35 634
Liabilities to group companies	65 745	103 425	138 998
Total liabilities	3 137 052	3 306 842	3 590 637

Ordinary share capital	424	426	426
Ordinary share premium	94 413	97 372	100 372
Reserves	144 307	161 960	177 872
Total equity attributable to equity holders	239 144	259 758	278 670
Preference share capital and premium	11 205	11 205	11 205
Minority shareholder's equity attributable to ordinary shareholders	190	191	185
Total equity	250 539	271 154	290 060
Total equity and liabilities	3 387 591	3 577 996	3 880 697

**Table 6.3: South African representative bank balance sheet 2012-2014**



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